# THE ROLE OF JOINT DEPLOYMENT AND RAPID DISTRIBUTION IN JOINT VISION 2010

A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements for the degree

MASTER OF MILITARY ART AND SCIENCE
General Studies

by

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B.A., Marshall University, Huntington, WV, 1983

Fort Leavenworth, Kansas
2000

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DTIC QUALITY INSPECTED 4

20001120 029

# REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

| 1. AGENCY USE ONLY (Leave blank) | 2. REPORT DATE | 3. REPORT TYPE AND DATES COVERED |
|---|---|---|
| | 2 Jun 00 | Master's Thesis 6 Aug 99--2 Jun 00 |

4. TITLE AND SUBTITLE

The Role of Joint Deployment and Rapid Distribution in Joint Vision 2010

5. FUNDING NUMBERS

6. AUTHOR(S)

MAJ Mark A. Ferris

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

U.S. Army Command and General Staff College
ATTN: ATZL-SWD-GD
1 Reynolds Ave.
Ft. Leavenworth, KS 66027-1352

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/ MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING/MONITORING

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

A

13. ABSTRACT (Maximum 200 words)

This study investigates the joint deployment and rapid distribution tenet of focused logistics and its capability to project forces and equipment into a theater of operations in support of the joint force commander of 2010. The thesis is a comparison study of the force projection capabilities and accomplishments of Operational Desert Shield with the projected capabilities of the year 2010. The US is becoming increasingly involved around the globe, but its military potential is not keeping pace. Peacetime operations tempo has never been higher. America's shrinking force, in contrast to increased diplomatic commitments around the globe, has created a dichotomy of policy and means. With a reduced forward presence, the US must enhance its ability to move the continental-based force. This study focuses on the force projection triad of airlift, sealift, and pre-positioned equipment. It emphasizes the need for a force projection structure that is capable of providing rapid and sustained support.

14. SUBJECT TERMS

Force Projection, USTRANSCOM, Joint Visision 2010, Focused Logistics, Joint Deployment and Rapid Distribution

15. NUMBER OF PAGES
109

16. PRICE CODE

| 17. SECURITY CLASSIFICATION OF REPORT | 18. SECURITY CLASSIFICATION | 19. SECURITY CLASSIFICATION OF ABSTRACT | 20. LIMITATION OF ABSTRACT |
|---|---|---|---|
| UNCLASSIFIED | UNCLASSIFIED | UNCLASSIFIED | UL |

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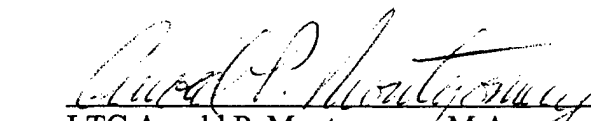
MASTER OF MILITARY ART AND SCIENCE

THESIS APPROVAL PAGE

Name of Candidate: Major Mark A. Ferris

Thesis Title: The Role of Joint Deployment and Rapid Distribution in Joint Vision 2010

Approved by: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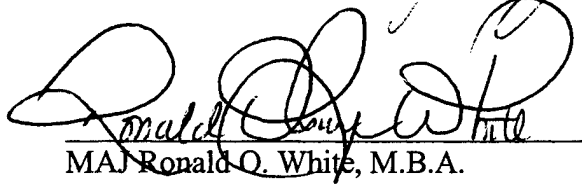
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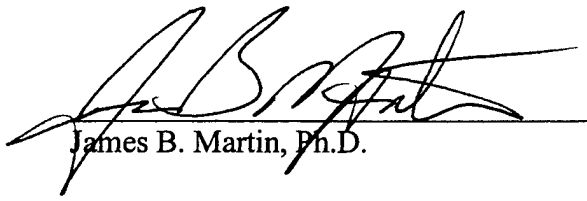
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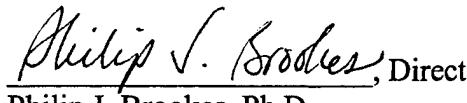
Accepted this second day of June 2000 by: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ABSTRACT

THE ROLE OF FOCUSED LOGISTICS IN JOINT VISION 2010 by MAJ Mark A. Ferris, USA, 97 PAGES

This study investigates the joint deployment and rapid distribution tenet of focused logistics and its capability to project forces and equipment into a theater of operations in support of the joint force commander of 2010. The thesis is a comparison study of the force projection capabilities and accomplishments of Operation Desert Shield with the projected capabilities of the year 2010.

The United States is becoming increasingly involved around the globe, but its military potential is not keeping pace. Peacetime operations tempo has never been higher. America's shrinking force, in contrast to increased diplomatic commitments around the globe, has created a dichotomy of policy and means. With a reduced forward presence, the United States must enhance its ability to move the continental based force.

This study focuses on the force projection triad of airlift, sealift, and prepositioned equipment. It emphasizes the need for a force projection structure that is capable of providing rapid and sustained support.

Force projection for the United States military is the responsibility of the United States Transportation Command (USTRANSCOM). This study evaluates the capabilities of USTRANSCOM, its component commands (Military Sealift Command, Air Mobility Command, and Military Traffic Management Command), and the civilian maritime sector.

ACKNOWLEDGMENTS

I want to thank Lieutenant Colonel Arnold Montgomery, Major Ronald White, and Dr. James Martin for their time, effort, and expertise while serving as members of the thesis committee.

The effort put into writing this thesis is that of the author. The time to write the work was provided by a family that is all too familiar with sacrificing their time for a professional soldier. At times, I am sure it appears that a soldier's family comes in a distant second to his or her profession but this author's family will always come first.

Mindy, Brittney, and Doha, thank you for your time and patience. I am truly blessed to have you in my life.

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## ABBREVIATIONS

| | |
|---|---|
| ADP | Automated Data Processing |
| AEF | Air Expeditionary Force |
| AIT | Automatic Identification Technology |
| AMC | Air Mobility Command |
| AOR | Area of Responsibility |
| APOD | Aerial Port of Debarkation (Offload) |
| APOE | Aerial Port of Embarkation (On-load) |
| APS | Afloat Pre-positioning Ships |
| ARCENT | Army Central Command |
| ATAV | Army Total Asset Visibility |
| COA | Course of Action |
| COE | Common Operating Environment |
| CONUS | Continental United States |
| COSCOM | Corps Support Command |
| COTS | Commercial Off The Shelf |
| CRAF | Civil Reserve Air Fleet |
| DTS | Defense Transportation System |
| DOD | Department of Defense |
| DLA | Defense Logistics Agency |
| DVD | Direct Vendor Delivery |
| EC | Electronic Commerce |
| EDI | Electronic Data Interchange |

| | |
|---|---|
| FSS | Fast Sealift Ship |
| GAO | Government Accounting Office |
| GCCS | Global Command and Control System |
| GTN | Global Transportation Network |
| HNS | Host Nation Support |
| ITV | Intransit Visibility |
| JCS | Joint Chiefs of Staff |
| JDTC | Joint Deployment Transportation Center |
| JFAST | Joint Flow & Analysis System For Transportation |
| JFQ | Joint Forces Quarterly |
| JHSS | Joint Health Services Support |
| JITV | Joint Intransit Total Visibility |
| JLOTS | Joint Logistics Over The Shore |
| JMCA | Joint Movement Control Agency |
| JMICS | Joint Maritime Command Information System |
| JP | Joint Publication |
| JOPES | Joint Operations Planning and Execution System |
| JRSOI | Joint Reception, Staging, Onward Movement, and Integration |
| JTAV | Joint Total Asset Visibility |
| JTTP | Joint Tactics, Techniques, and Procedures |
| JV 2010 | Joint Vision 2010 |
| LMSR | Large, Medium Speed Roll-On and Roll-Off Ships |
| LOC | Lines of Communication |

| | |
|---|---|
| LOC | Logistics Operations Center |
| MAC | Military Airlift Command |
| MAGTF | Marine Air-Ground Task Force |
| MARAD | Maritime Administration |
| MEF | Marine Expeditionary Force |
| MHE | Materiel Handling Equipment |
| MOOTW | Military Operations Other Than War |
| MPF | Maritime Pre-positioning Force |
| MRS | Mobility Requirements Study |
| MSC | Military Sealift Command |
| MTMC | Military Transportation Movement Command |
| MTS | Movement Tracking System |
| MTW | Major Theater War |
| NATO | North American Treaty Organization |
| NCA | National Command Authority |
| NFAF | Navy Fleet Auxiliary Force |
| OPLAN | Operational Plan |
| PAX | Personnel |
| RBA | Revolution in Business Affairs |
| PC LINK | Personal Computer Logistics Information Network |
| RF | Radio Frequency |
| RMA | Revolution in Military Affairs |
| RO-RO | Roll-On and Roll-Off |

| | |
|---|---|
| RRF | Ready Reserve Force |
| RSO&I | Reception, Staging, Onward Movement, and Integration |
| SAC | Strategic Air Command |
| SECDEF | Secretary of Defense |
| SIPRNET | Secret Internet Protocol Router Network |
| SPOD | Sea Port of Debarkation |
| SRP | Sealift Readiness Program |
| STONs | Short Tons |
| SUPCOM | Support Command |
| SWA | Southwest Asia |
| TAV | Total Asset Visibility |
| TD | Theater Distribution |
| TPFDD | Time Phased Force Deployment Data |
| TPFDL | Time Phased Force Deployment List |
| UPS | United Parcel Service |
| USACOM | United States Atlantic Command |
| US | United States |
| USAF | United States Air Force |
| USCENTCOM | United States Central Command |
| USTRANSCOM | United States Transportation Command |
| VISA | Voluntary Intermodal Sealift Agreement |

# TABLES

# CHAPTER 1

# INTRODUCTION

## Background

During the second half of the twentieth century, America's focus was the Cold War. The national security strategy of the United States (US) was clearly defined to protect against the overarching threat of the Soviet Union and Communist expansion. With the demise of the Soviet Union, the US needed to reevaluate its role in the world as the single superpower.

Since the fall of the Soviet Empire, the US has paid the peace dividend in a manner similar to other post-war periods, such as those after World War II, Korea, and Vietnam. Today, the US is becoming increasingly involved around the globe, but its military potential is not keeping up. Peacetime operations tempo has never been higher and well-intentioned assistance missions have pulled the US into the affairs of other nations more deeply than originally intended. America's shrinking force, in contrast to increased diplomatic commitments around the globe, has created a dichotomy of policy and means. With a reduced forward presence, America must enhance its ability to move the continental based force.

Threats to America's vital interests in the twenty-first century are numerous and many of them will be unforeseeable. Present and future threats include: sabotage of its national information infrastructure, terrorism, proliferation of weapons of mass destruction, and the spread of extremist Muslim nationalism in the Middle East. Uncertainty exists over the future of Russia and questionable security of poorly

maintained intercontinental ballistic missile systems in the former Soviet Republics. The Korean peninsula remains a powder keg.

The forces, equipment, and supplies that produced America's success in the Cold War and in the Persian Gulf no longer exist. To counter these increasing threats, the US needs to develop a military strategy that provides a force mobile and lethal enough to respond anywhere in the world at anytime, yet not too focused or fixed in place.

To counter these changes, the Department of Defense (DOD) developed Joint Vision 2010 (JV 2010). Its purpose is to ensure America's national objectives remain attainable in the twenty-first century. In JV 2010, military objectives remain fundamentally the same; however, how the US achieves those objectives change. In May 1996, the Chairman of the Joint Chiefs of Staff General John M. Shalikashvili released *Joint Vision 2010 (JV 2010).*

"The nature of modern warfare demands that we fight as a joint team. This was important yesterday, it is essential today, and it will be even more imperative tomorrow. JV 2010 provides an operationally based template for the evolution of the Armed Forces for a challenging and uncertain future. It must become a benchmark for Service and Unified Command visions" (Chairman of the Joint Chiefs 1996, 1).

## Joint Vision 2010

In 2010, instead of relying on massed forces and sequential operations, the American military will achieve their desired end state utilizing other methods (information superiority, advances in technology, higher lethality weapons). The Services will be required to fight as a joint force and accomplish the effects of mass with

less need to mass forces physically than in the past. JV is the conceptual template for how the DOD will structure its armed forces for the twenty-first century.

This template provides a common direction for the services in developing their unique capabilities, within a joint framework of doctrine and programs, as they prepare to meet an uncertain and challenging future. JV 2010 guides the DOD warfighting requirements and procurement and focuses technological development. JV 2010's key enablers of information superiority and technological innovation will transform the current concepts of maneuver, strike, protection, and logistics into the new operational concepts of dominate maneuver, precision engagement, full-dimensional protection, and focused logistics. Each of these operational concepts reinforces the others and allows the US to achieve massed effects in warfare from more dispersed forces. This synergy will greatly enhance the US capabilities in high-intensity conventional military operations. These four new concepts will enable America to dominate the full range of military operations from humanitarian assistance, through peace operations, up to and into the highest intensity conflict.

## Focused Logistics

Focused logistics developed as the logistical support concept of the twenty-first century. It is the fusion of information, logistics, and transportation technologies to provide rapid crisis response, to track and shift assets even while enroute, and to deliver tailored logistics packages and sustainment directly to the strategic, operational, and tactical level of operations. The impetuses most often cited for developing focused logistics are downsizing the force, the changing threat environment facing America, technology, and new political and fiscal realities.

Focused logistics requires logisticians to fully examine the big picture versus maintaining their current functional service stovepipes. Logisticians must have the capability to tailor forces and resources by expanding and contracting them as the nature of the threats changes. Effective execution of these missions requires an adaptive, responsive, and reliable logistics system. The goal is "full-spectrum support" from deployment to redeployment (Joint Chiefs of Staff J4 1997, ii).

As the US downsizes its logistics footprint, it must streamline logistics organizational structures. The logistics footprint of the future will be a more precise balance between "Just in Case" and "Just in Time" with a goal of "Just Enough" (Joint Chiefs of Staff J4 1997, ii-iii.). Supporting the warfighter from a source of supply to a point of need, whether it is a foxhole, cockpit, deck plate, or base requires maximizing the advantages gained from information superiority and technological innovation (Chairman of the Joint Chiefs 1996, 25). The desired end-state is full spectrum supportability.

The Joint Staff, in coordination with the Unified Commander and Chiefs (CINC) and services, developed six tenets to support focused logistics: information fusion, joint theater logistics command and control, multinational logistics, joint health service support, agile infrastructure, and joint deployment and rapid distribution (Joint Chiefs of Staff J4 1997, v).

## Joint Deployment and Rapid Distribution

Joint deployment and rapid distribution is the process of moving multiservice forces to an operational area coupled with the accelerated delivery of logistics resources. Improved transportation and information networks will accomplish this. This provides

the warfighter with vastly improved visibility and accessibility of assets from source of supply to point of need. It further develops the joint reception, staging, onward movement, and integration (JRSOI) phase of joint force deployment.

In the near future, the US will face the task of committing forces on short notice to potentially hostile environments of unknown duration. Unlike Desert Shield, America may not have the lead-time necessary to develop the traditional logistics infrastructure of the twentieth century. How will the US get its forces to the battlefields of the twenty-first century?

According to JV 2010, the key to operational success is America's ability to rapidly move combat power to a supported CINC's theater, ready for mission execution. The joint definition of joint deployment and rapid distribution is the process of moving multi-service forces to an operational area coupled with the accelerated delivery of logistics resources through improved transportation and information networks providing the warfighter with vastly improved visibility and accessibility of assets from source of supply to point of need (Joint Chiefs of Staff J4,5). The development of a new publication for the Joint Deployment System (JDS), Joint Pub 3-35, *Joint Deployment and Redeployment Doctrine,* will provide deployment and redeployment guidance and principles to the joint force commanders, their staffs, and the joint planning and execution community (Joint Chiefs of Staff J4,6).

## Scope

This project will attempt to assess the joint deployment tenet of focused logistics to determine if it is the answer to the force projection requirements of 2010. To answer the

thesis question, this work will compare the proposed end state capabilities of the joint deployment concept with the force projection requirements of JV 2010.

This thesis examines the requirements, accomplishments, and lessons learned from Desert Shield as a reference point to analyze the force projection requirements of a major theater war (MTW) in the year 2010.

Force projection in the twenty-first century depends on many of the same concepts employed in the twentieth century. This paper will examine the command and control requirements of force projection, the strategic lift (both sealift and airlift) to determine the requirements and capabilities in 2010, the concept of pre-positioning equipment (both ashore and afloat), and the rapid distribution of equipment and supplies from the US to a MTW.

## Primary Question

Can the joint deployment and rapid distribution tenet of focused logistics enable the Joint Force Commander of 2010 to project required forces into the theater of operations as efficiently as the force projection structure employed in support of Operation Desert Shield (OPERATION DESERT SHIELD)?

## Secondary Questions

1. What were the major force projection accomplishments of Operation Desert Shield?
2. What were the force projection lessons learned from Desert Shield?
3. What is Joint Vision 2010 and how does it support the Joint Forces Commander?
4. What is the threat in the twenty-first century?

5. Will the DOD have sufficient assets (strategic airlift, strategic sealift, and pre-positioned equipment) to support a major theater of war in 2010?

6. Can pre-positioned equipment, both afloat and ashore, combine with forward-deployed forces to provide ready forces and initial sustainment early to ease lift requirements?

7. What programs exist to reduce strategic lift requirements and provide for a rapid employment of combat equipment?

8. Will the concept of rapid distribution support accelerated delivery of logistics resources to the Theater of Operations?

9. Will the downsizing of the military's force structure negatively impact the armed forces ability to project forces?

## Assumptions

1. This project assumes all operational concepts put forth by JV 2010 become reality in the twenty-first century.

2. Technological advances will meet all of the technological requirements of Joint Vision 2010.

3. The DOD budget will be sufficient to support the hardware and software requirements of JV 2010.

4. The service chiefs, CINCs, and National Command Authority will continue to endorse JV 2010.

5. Current agreements with the civilian transportation sector (Civil Reserve Air Fleet and Voluntary Intermodal Service Agreement) will remain firm in the twenty-first century.

6. The US will have a sufficient number of merchant marine vessels and merchant marine sailors to support its sealift requirements.

7. This project assumes the US will not be required to deploy and fight two MTW engagements simultaneously.

## Limitations

There are no significant limitations at this time. Sufficient research materiel is available. Sufficient time is available to complete this project.

## Delimitations

The primary question in this paper is from a research list submitted to the Command and General Staff College by the US Atlantic Command (USACOM). The Atlantic Command's original topic submission asked, "Will Focused Logistics enable the Joint Force Commander to combine forces and actions to attain operational objections in 2010 more efficiently than today?" The author's election to focus on one tenet does not sufficiently address USACOM's original question, but will provide an in-depth analysis of the joint deployment and rapid distribution tenet.

## Significance of the Study

Validating one tenet of focused logistics as an enabler for JV 2010 and the joint warfighting commanders is vital to the continued success of America's military. To successfully execute JV 2010, each of its four concepts must be valid. In order to validate focused logistics, logisticians must examine and validate each tenet. This research project, through a review of available literature, will attempt to determine the endstate capabilities of joint deployment and its ability to support the joint force

commander in the twenty-first century. This study is also significant because it provides an assessment of US's capability to project forces in the twenty-first century.

## Key Terms

The definitions and explanations for key terms are located in glossary of this paper.

# CHAPTER 2

# LITERATURE REVIEW

## Internet Sources

In conducting this study, the Internet was an extremely valuable resource. Having selected this topic on a Friday and after speaking to the US Atlantic Command (USACOM) point of contact, it was clear that the author needed to develop a working knowledge of JV 2010. Given the incredible pace at which JV 2010 has grown since 1996, the Internet served as the most up-to-date method of gathering information. Using America on Line (AOL), Yahoo, and other search engines, it was very easy to locate information on JV 2010 and the many associated topics used during this study.

The logical starting point for researching this topic was *Joint Vision 2010.* It was found at the Joint Chiefs of Staff web site at http://www.jcs.mil. This site provides copies of numerous joint publications used in this project to include: *Joint Vision 2010,* its companion document, *Concept for Future Joint Operations, Expanding Joint Vision 2010,* and Joint Publication 4.0, *Doctrine Logistics Support of Joint Operations.* These publications were useful in building the foundation for this paper.

*JV 2010* as discussed in chapter 1, provided the conceptual framework for America's Services, commands, and defense agencies as they prepare to meet an uncertain and challenging future. The framework is a means by which to leverage technological opportunities and to channel human vitality and innovation to achieve new levels of effectiveness in joint operations.

The *Concept for Future Joint Operations (CFJO)* amplifies *JV 2010*'s four new operational concepts, each enabled by information superiority and technological

innovation. *CFJO* is a living document providing the initial basis for a variety of assessment activities. It will subsequently be refined based on assessment results.

Joint Publication 4.0, *Doctrine Logistics Support of Joint Operations,* served as a reference for background information as to how and by whom joint forces are currently supported. This document is currently under revision to reflect the twenty-first century vision.

Next came the process of building on the foundation provided by *JV 2010* . The Joint Chiefs of Staff J4 homepage provided information on the concept of focused logistics. The *Focused Logistics Roadmap* can be accessed at http://www.acq.osd.mil/-log/mosaic. This work introduces the tenets of focused logistics and provides a brief overview of each of the six tenets. After completing extensive research on the tenets, the author elected to select one tenet to focus on for this paper. Examining all six tenets would have been an overwhelming task for a 75-100 page paper.

The Internet provided access to the Joint Warfare Training Center, jwtc.acom.mil/papers/djtpaper.com, and other joint vision enabling projects currently under development at the US Atlantic Command (USACOM). USACOM serves as the proponent for testing, validating, and refining JV 2010.

The US Transportation Command (USTRANSCOM) website http://ustcweb.safb.mil/access.html provided a starting point for examining the unified command responsible for surface, sea, and air movement for US forces. From this homepage, the three subordinate commands whose examination is critical to understanding the requirements and capabilities of strategic lift can be accessed: the Air Mobility Command (AMC), http://public.scott.af.mil/hqamc; Military Traffic

Management Command (MTMC), http://www.mtmc.army.mil; and the Military Sealift Command (MSC), http://www.msc.navy.mil. A review of these organizations provides a current base of capabilities and an insight into the future evolution of strategic lift. They outline the military as well as the civilian components of strategic lift.

## Periodicals

This section addresses only a few of the numerous articles reviewed during this project. The majority of articles examined came from government-sponsored sources such as *Army Logistician, Transportation Journal, Joint Force Quarterly (JFQ),* and *Air Power Journal.* The articles selected from these journals primarily focused on current developments and innovations concerning JV 2010, focused logistics, joint deployment, strategic lift, USTRANSCOM, asset visibility, and technological advances.

The first two articles appeared in the January-February 1999 issue of *Army Logistician.*.

"Army Total Asset Visibility" written by Cecilia Butler and Sandra Latsko focuses on the automatic identification technologies required to maintain and obtain information on the location, quantity, condition, and movement of assets through the logistics pipeline.

"Joint Vision 2010 and Focused Logistics" written by Lieutenant General John McDuffie provides a snapshot of the role focused logistics in JV 2010. It stresses information fusion as the key to success.

"Focused Logistics: The Joint Logistics Roadmap to Joint Vision 2010," produced by the Joint Staff J4 charts the course for gaining full-spectrum support across the range of possible missions envisioned in JV 2010.

"The Joint Force Commander and Global Mobility" authored by the USTRANSCOM Commander, General Walter Cross, and printed in the spring 1998 *Joint Force Quarterly* discussed several points of interest. General Cross provides a very open view of USTRANSCOM's capability to support two major theater wars simultaneously. He highlighted the need for detailed planning by supported and supporting CINC staffs in the formulation of the time phased force deployment data (TPFDD) and operational plans (OPLAN). Detailed planning is critical in order to allocate scarce mobility assets. The article confirms that joint operations planning and execution system (JOPES) remains difficult and time consuming. USTRANSCOM is examining technologies and processes for a system to complete TPFDD level detail deployment planning in one hour. The article also provided information on the Joint Deployment Training Center (JDTC) and its mission to improve the deployment process through doctrinal developments, education, and training to offer effective and efficient support to Joint Force Commanders (JFC).

"A Fight for Lodgement" in *JFQ's s*pring 1996 issue provided insight on the need for forces to plan for the worst case scenario when non-permissive entry is required to secure ports or airfields and establish a lodgement to receive follow-on forces.

"In Search of Focused Logistics" written by Lieutenant General John Cusick discusses actions currently working in the Joint Chiefs of Staff J4. It highlights advances in strategic lift, both sea and air, joint reception, staging, onward movement, and integration (JRSOI), theater distribution, the C-17, and other innovations that provide the US with an unprecedented strategic force projection capability.

## Books

The books reviewed focused primarily on the force projection issues of Operation Desert Shield. The books listed below, along with several others, provided the data necessary to build a base from which to compare projection capabilities that will exist in the twenty-first century. The research focused on the numerous aspects of the Operation Desert Shield deployment to include planning, USTRANSCOM operations, strategic lift, prepo-afloat, port operations, and lessons learned.

*So Many, So Much, So Fast* written by James Matthews and Cora Hold examined the US strategic lift for Operation Desert Shield from the perspective of USTRANSCOM, the unified command responsible for deploying and sustaining American forces worldwide. The book emphasized the interrelationships of the three transportation modes: air, land, and sea. It places the deployment in the context of the overall joint operation. The book covers seaport and airport operations in the continental US (CONUS) and outside the continental US (OCONUS); the performance of C-141 and C-5 aircraft; airlift of passengers and cargo; the Civil Reserve Air Fleet (CRAF); the Ready Reserve Force (RRF), afloat pre-positioning; and fast sealift ship transportation of materiel in support of the war effort. The book looks at the accomplishments of the Desert Shield transportation system and, based on lessons learned, provides recommendations in areas that need attention to correct and preclude the shortfalls from recurring in the future.

*Moving Mountains* by Lieutenant General Gus Pagonis, the senior logistician in the theater during the war, looked at the accomplishments and lessons learned from the

perspective of an insider at the top of the logistical decision-making process during Operation Desert Storm. This book must be viewed in the context of autobiography.

*Gathering the Storm: Contingency Planning and Force Projection* by Paul Tiberi and James C. Wendt provided additional data concerning accomplishments and shortfalls during Operation Desert Shield.

*Moving the Force, Desert Storm and Beyond* by Scott Conrad demonstrated how demobilization decisions made in the "in between years" have traditionally led to poor preparedness to fight the next conflict, no doubt convincing adversaries of America's vulnerability. Logistics, especially mobility, has been a traditional bill payer for combat equipment. Conrad's work covered the performance of the Air Force's C-141 and C-5 during the Gulf Crisis and the shortfalls identified by the lack of intransit visibility.

*Conduct of the Persian Gulf War: Final Report to Congress,* April 1992. This work provided facts concerning the conduct of both Desert Shield and Desert Storm. Appendix F, "Deployment," focused on the accomplishments and lessons learned from the operation. The work encompasses all aspects of the deployment process. It provided materiel on several programs employed during Desert Shield to include: afloat pre-positioning, the CRAF, the SRP, the RRF, and fast sealift ships (FSS). The book also covers the performances of USTRANSCOM, Military Sealift Command (MSC), and Air Mobility Command (AMC).

US Government Official Documents

The US General Accounting Office was a source of several important documents during the research phase; four of which are highlighted below.

*Military Pre-positioning, Army and Air Force Programs* provided information on current and projected pre-positioning plans. It went into detail on the composition, location, and mission of both afloat pre-positioning and ashore pre-positioning. The report highlighted one disturbing fact; several of the ashore prepo sites were not being properly maintained.

*Military Pilots: Observations on Current Issues* focuses on the validity of pilot requirements; the extent of the reported shortages and where they exist; key factors contributing to pilot shortages; the services' plans for correcting such shortfalls; and other steps to address the problem. During the draw-down in the nineties the services reduced their pilot accessions, resulting in an insufficient number of pilots to support the force.

*Desert Shield and Desert Storm, USTRANSCOM's Support of Operation Desert Shield and Desert Storm* published in January 1992, covered the command's performance during its first test. At the time of Operation Desert Shield, USTRANSCOM had existed for only three years. A few of the important areas covered by the report were assessment of transportation management, lack of plans on the part of USTRANSCOM and US Central Command (USCENTCOM), and organizational problems created by the command relationships among USTRANSCOM and its component commands and their transition from a peacetime relationship to a wartime relationship.

*Desert Shield and Desert Storm, Air Mobility Command's Achievements and Lessons Learned for the Future,* published in January 1993, evaluated the Air Mobility Command's airlift operation. The report found that AMC performed well under demanding circumstances and demonstrated flexibility in its response to unanticipated difficulties associated with the exercise. A few of the important areas addressed in the

report were aerial ports of debarkation, CENTCOM's changing priorities, lack of a recovery base, reserve air crews, activation and performance of the Civil Reserve Air Fleet, and Desert Express flights.

US Government Official Documents (Contracted Projects)

Projects conducted by RAND Corporation provided significant information for this paper. The three listed below were of great value during the project.

*An Assessment of Strategic Airlift Operational Efficiency: Project Air Force Analysis of the Air War in the Gulf,* authored by John Lund, Ruth Berg and Corinne Replogle, assesses strategic airlift operations during Operation Desert Shield and Desert Storm. It provides insight into the accomplishments, shortfalls, and lessons learned in strategic airlift during Operation Desert Shield. It examines planning, aircrews, enroute and staging bases, aircraft performance, and CRAF performance. It closes by addressing some of the most important questions raised for the future: the C-141, C17, the effect of base closures, and MHE modernization.

*Project Air Force Analysis of the Air War in the Gulf: The Civil Reserve Air Fleet in Operation Desert Shield and Desert Storm,* authored by Mary Chenoweth, contains information on the first-ever activation of the CRAF. It concludes that CRAF was a combat multiplier during Desert Shield and its cost effectiveness during peacetime make its continuation essential to the future of America's strategic mobilization force. As the military transitions to a more US-based force, the need to deploy troops over longer distances places a high premium on strategic airlift capability.

*Getting US Military Power to the Desert* by David Kassing highlighted many of the same areas previously discussed. This report provided six issues for consideration in improving force projection:

1. The need for more responsive planning
2. The need to improve the coordination of deployment operations
3. The need for pre-positioning
4. The need to improve some aspects of the CONUS base to facilitate more efficient force projection
5. The need to develop new methods of providing needed airlift
6. The need to develop new methods of improving sealift capabilities and the need to improve theater reception capabilities

## Service Visions

To compliment *JV 2010,* each of the Services developed supporting doctrine for the twenty-first century: the Army's *Force XXI*, the Navy's *Forward...From the Sea*, the Marine's *Operational Maneuver From the Sea,* and the Air Force's *Global Engagement.* Each of these documents revealed a change in focus and a change in priorities. Each vision contains a focus on power projection and interoperability for joint operations.

The Force XXI and The Army After Next processes are identifying new concepts of land warfare that have radical implications for the Army's organization, structure, operations, and support. Lighter, more durable equipment will enhance deployability and sustainability, and advanced information technologies will help the Army conduct decisive operations. Overall, the Army will require flexible, highly tailorable organizations. Flexibility must be developed at all levels, from individuals to

small units to echelons above corps, to meet the diverse needs of future operations and to reduce the lift requirements for deployment to a theater.

*Global Engagement: A Vision for the twenty-first Century Air Force*, the Air Force's vision of air and space warfare through 2010, calls for maintaining and improving six core competencies built on a foundation of quality personnel and integrated by global battlespace awareness and advanced command and control. Air and space superiority will allow all US forces freedom from attack and freedom to attack, while the Air Force's ability to attack rapidly anywhere on the globe will continue to be critical. Rapid global mobility will help ensure the US can respond quickly and decisively to unexpected challenges to its interests. The Air Force's precision engagement core competency will enable it to reliably apply selective force against specific targets simultaneously, to achieve desired effects with minimal risk and collateral damage. Air- and space-based assets will contribute to US forces' information superiority, and agile combat support will allow combat commanders to improve the responsiveness, deployability, and sustainability of their forces.

The Navy's future vision of warfare, delineated in *From the Sea* and *Forward . . . From the Sea*, and further developed in the *Navy Operational Concept*, identifies five fundamental and enduring roles: sea control and maritime supremacy, power projection from sea to land, strategic deterrence, strategic sealift, and forward naval presence. However, in the future the Navy will fulfill these roles with vastly enhanced capabilities. The Navy has embraced a Revolution in Military Affairs (RMA) concept called Network-centric Warfare: the ability of widely dispersed but robustly networked sensors, command centers, and forces to have significantly enhanced massed effects. Combining

forward presence with network-centric combat power, the Navy will close timelines, decisively alter initial conditions, and seek to head off undesired events before they start. The naval contribution to dominant maneuver will use the sea to gain advantage over the enemy, while naval precision engagements will use sensors, information systems, precisely targeted weapons, and agile, lethal forces to attack key targets. Naval full-dimensional protection will address the full spectrum of threats, providing information superiority, air and maritime superiority, theater air and missile defense, and delivery of naval fires. Finally, naval forces will provide sea-based focused logistics for joint operations in the littorals.

*Marine Corps Operational Maneuver from the Sea* foresees warfare that requires tactically adaptive, technologically agile, opportunistic, and exploitative forces. Individuals and forces must be able to rapidly reorganize and reorient across a broad range of new tasks and missions in fluid operational environments. The Marines will still need to project power ashore for a variety of potential tasks ranging from disaster relief to high-intensity combat.

## Private Publications

The two articles below appeared in the 6 September 1996 issue of *The Army Times* and the 5 October issue of *The Air Force Times,* respectively. These articles were originally viewed with skepticism because of their source; however, other sources validated the information contained in them.

Brian Jordan's article "Two Heavy Lifters - the C-5, and the C-141 Need Retooling" questioned the Air Force's capability to support two major theaters of war, poor aircraft operational rates, the C-5 Galaxy retrofit project (avionics), and the need to

install the C-5 with an advanced global positioning systems and a collision avoidance capability. The article identified the need for a new engine for the C-5 aircraft and brought to light the "tail number crisis."

Bryant Jordan's article "It's not Going Away, Pilot Shortage May Not Be Fixed for 20 Years" highlighted the shortage of pilots in the US Air Force.

# CHAPTER 3

# RESEARCH DESIGN

## Background

In theory, technological advances in the lethality of weapons currently being development will require fewer forces to support the national military strategy. The research revealed there had been no determination made as to what size of force structure will be needed to fight a major theater war in the twenty-first century. To measure the tenet's capability to support JV 2010's force projection requirements, a "yardstick" needed to be selected.

The yardstick selected was the force projection of Operation Desert Shield. While this is not a case study of Desert Shield force projection, a good portion of this paper deals with the requirements, accomplishments, shortfalls, and lessons learned from the operation. The requirements of Operation Desert Shield provide the details of what transportation assets are needed to move the force. The accomplishments show what missions were completed with the assets available. From this, the US can develop a list of what assets are required to deploy the force. The shortfalls provide insight on how the deployment could have been executed more efficiently. After examining the shortfalls of Desert Shield, it can determined if the Department of Defense (DOD) corrected the shortfalls, thus precluding them from impacting future deployments.

Given the fact that the lethality of weapons will require the deployment of fewer forces to accomplish the mission in the next century, the determination was to develop a worst case scenario. If a major theater war erupted in the year 2010 requiring nearly the

same force structure within a similar time frame as Desert Shield and Desert Storm, could the US successfully respond?

This thesis uses a general research model to answer the thesis question. The initial time-table for completing this project was:

Thesis Timetable

| | |
|---|---|
| Conducting the Research | August - December |
| Evaluation of Materiel | December - January |
| Analyzing the Evidence | February - March |
| Conclusions and Recommendations | April |

Due to the nature of the research material and its appeal to the author, it was possible to complete the project well ahead of schedule.

Conducting the Research

As discussed earlier, the initial research led to a change of topics. After selecting the joint deployment tenet, the research was conducted in two phases. Phase I consisted of researching and gathering available published materiel using various sources including the Combined Arms Research Library (CARL), the Center for Army Lessons Learned (CALL) Database, previously completed graduate student work, and the Internet. The research focused primarily on: JV 2010, focused logistics, joint deployment, the force projection process, and Operation Desert Shield force projection requirements, accomplishments, and shortfalls.

Phase II revolved around analyzing and cross-referencing the data contained in each category to locate additional sources that could assist in the research process. This

was beneficial in that nearly every source opened the door to another source and then another source.

## Evaluating the Materiel

After gathering the materiel and deciding on a workable organization, the next step was to evaluate and validate the data. It was vital to determine if the data was factual and unbiased before including it in the analysis. Nearly all the resources, to include autobiographies and biographies, turned out to contain factual data as validated by information located in official government publications.

## Analyzing the Evidence

Following the validation process, the next step was to study and analyze the information. This thesis will follow the rules of evidence outlined in *CGSC Student Text 20-10.* To compare Desert Shield force projection accomplishments and the tenet of Joint Deployment, it was necessary to develop a list of areas to compare. The major areas selected for analysis were:

1. The Planning Process--Planning processes used to ensure the required forces arrive in theater within an acceptable time frame using available strategic lift assets
2. The US Transportation Command--Mission
3. Strategic Lift--Available force projection assets
4. Pre-positioned Equipment--Location and purpose
5. Civilian Augmentation--Assets available to supplement military strategic lift
6. In-Transit Visibility--Ability to track forces, equipment, and supplies enroute and in-theater until completion of the JRSOI phase

7. Joint reception, staging, onward movement, and integration (JRSOI) Requirements is the final phase of force deployment. It involves getting equipment and personnel to the fight after arrival in theater.

8. Early Entry Forces--Forces available to secure ports and airfields to receive arriving forces

## Conclusions and Recommendations

The final step in the thesis process was to logically answer the thesis question based on the facts available. The answer produced several recommendations for future consideration or action. This thesis seeks to answer the primary and secondary questions and provide recommendations to improve America's force projection capability in the twenty-first century.

# CHAPTER 4

# ANALYSIS

## Introduction

This chapter is divided into three sections. It analyzes the information gathered during the research phase of this project. The first section covers the force projection accomplishments, shortfalls, and lessons learned from Operation Desert Shield. The second section deals with the current and projected force deployment capabilities scheduled to exist in fiscal year 2010. Section two also lists some to the technology currently under development to support joint deployment in the next century. The final section compares the force projection assets of Operation Desert Shield with the anticipated force projection capabilities of the twenty-first century.

## Operation Desert Shield

The overwhelming victory in Operation Desert Storm was due to not only the unparalleled proficiency and unequaled confidence of US combat forces, but also to the highly successful implementation of an effective and farsighted logistic plan and operation. At the start of the air phase of Desert Storm, USTRANSCOM had deployed more than 300,000 soldiers, 12,400 tracked combat vehicles, and 114,000-wheeled vehicles. (Shrader 1997, 761) During the first ninety days of Operation Desert Shield, USTRANSCOM coordinated the movement of nearly five army divisions, eighteen USAF fighter squadrons, a US Marine Corps (USMC) marine expeditionary force (MEF), and supporting units. In the next seventy-five days, USTRANSCOM moved nearly four army divisions, nine US Air Force (USAF) fighter squadrons, a second USMC MEF, and supporting units (Kassing 1992, 11).

The analysis of section one begins with an examination of the OPLAN and transportation plan existing for a Desert Shield scenario and events affecting the mobility of transportation assets throughout the deployment. Next, the paper examines the performance of the USTRANSCOM and its component commands during the crisis. The author will then examine strategic lift: air, sea, and pre-positioned. The paper will next examine the contributions of the civilian sector, allied nations, and the host nation of Saudi Arabia. The first section of this chapter ends with an examination of lessons learned from Operation Desert Shield.

## Operation Desert Shield Planning

The deployment for Desert Shield began without a valid operational plan (OPLAN) or feasible transportation plan. Central Command (CENTCOM) OPLAN 1020-90 was undergoing a final review in August 1990. Requirements evolved as the deployment developed and changed frequently. Each OPLAN must have extremely detailed time-phased force deployment data (TPFDD) with accurate data for every unit for optimal use and allocation of strategic airlift. Desert Shield began without an existing TPFDD. The TPFDD conferences for OPLAN 1020-92 were scheduled for November 1990 and February 1991. The final deployment plan was scheduled to be published in April 1991. CENTCOM developed a TPFDD as operation Desert Shield progressed. This TPFDD changed often and thus complicated airlift planning. The absence of a detailed plan also meant that at times, airlift was significantly underutilized. (Department of Defense 1992, 10) The lack of a TPFDD forced Air Mobility Command (AMC) to operate in a reactive mode to CENTCOM's changing priorities rather than being able to anticipate its airlift requirements (General Accounting Office 1992, 5).

Experience and training on the Joint Operational Planning and Execution System (JOPES) was lacking in some units and on some installations expected to use it. Some installations had not yet fielded JOPES (Kassing 1992, 9). Units in Europe had not foreseen a deployment outside of Europe, therefore, little if any unit data existed in JOPES. Three major factors affected the use of JOPES in the initial phases of the operation. First, the information necessary for deployment was not loaded into the TPFDD. Second, operational considerations in the area of responsibility required CENTCOM to repeatedly change the priority and scheduling of unit movements but because of the JOPES level of development, JOPES could not react quickly enough to the frequency and magnitude of the changes. Third, the infrequent use of JOPES in peacetime resulted in a shortage of JOPES-capable operates.

US Transportation Command

USTRANSCOM's mission was to provide strategic air, land, and sea transportation to deploy, employ, and sustain military forces to meet national security objectives throughout the range of military operations. USTRANSCOM, established in 1987, was a relatively new command and did not have a wealth of experience to draw from (General Accounting Office 1992, 7). During the Gulf Crisis it exercised command over assigned common user transportation resources for each of its components: the Air Force's Air Mobility Command (AMC), the Navy's Military Sealift Command (MSC), and the Army's Military Traffic Management Command (MTMC). This included common user airlift and sealift, CONUS land transportation, port-loading operations, and management of charter and donated commercial airlift (General Accounting Office 1992, 1).

The command relationships for USTRANSCOM and its subordinates differed in peacetime and war. During peacetime, the components operated autonomously from USTRANSCOM. In wartime, the Transportation Command assumed operational command over the components and their transportation forces. Because Desert Shield was initially considered a "crisis" and not a wartime situation, the services either did not know or understand the command's role and continued to act independently. Peacetime lines of authority remained operative, and the services and component commands tended to work together as in peacetime. USTRANSCOM officials stated that their overall effectiveness was hindered because their components and the services did not always keep them well informed and their transportation information was limited. Officials had not developed specific policies and procedures to efficiently convert from peacetime to wartime (General Accounting Office 1992, 7-8). USTRANSCOM's only other major wartime contingency deployment was Operation Just Cause in 1989.

## Strategic Lift

Strategic lift is America's ability to project and sustain combat forces forward and is crucial to attaining national security objectives. USTRANSCOM projected forces, equipment, and sustainment, farther, faster, and in greater quantities than at any other time in America's history.

Table 1 shows the strategic lift summary for Operation Desert Shield airlift and sealift formed the core of the capabilities. The US also provided lift for other Coalition members: equipment and personnel from France and the United Kingdom to Saudi Arabia, German Roland and Dutch Patriot Air Defense Artillery to Turkey, and Czech and Romanian chemical defense units to Saudi Arabia (Department of Defense 1992,

E-9, 10). Estimates place the US cost of the Operation Desert Shield deployment at $4.5 billion (Kassing 1992, 11).

TABLE 1
LIFT SUMMARY

| | AIRLIFT | | | SEALIFT | | | |
|---|---|---|---|---|---|---|---|
| | MISSIONS | CARGO | TROOPS | VOYAGES | CARGO | FUEL | TROOPS |
| AUG | 1,668 | 49,946 | 67,263 | 21 | 253,000 | 334,000 | 315 |
| SEP | 1,813 | 68,880 | 60,476 | 37 | 252,000 | 509,000 | 681 |
| OCT | 1,421 | 54,295 | 51,154 | 71 | 434,000 | 517,000 | 436 |
| NOV | 1,502 | 43,926 | 20,553 | 36 | 264,000 | 1,011,000 | 186 |
| DEC | 2,737 | 90,587 | 105,413 | 70 | 477,000 | 894,000 | 465 |
| JAN | 3,272 | 118,144 | 132,095 | 149 | 910,000 | 1,088,000 | 516 |
| FEB | 3,052 | 95,509 | 45,562 | 68 | 527,000 | 1,337,000 | 147 |
| MAR | 2,531 | 40,013 | 10,983 | 14 | 301,000 | 413,000 | 30 |
| TOTAL | 18,056 | 558,300 | 493,449 | 466 | 3,390,000 | 6,103,000 | 2,776 |

*(Conduct of the Persian Gulf War, Final Report to Congress:* Department of Defense 1992, 3)

## Airlift

Airlift played a vital role in Gulf, especially during the initial month of the operation. From the start of deployment, until the end of the war, AMC flew approximately 15,000 missions. AMC organic airlift (C-5 and C-141) flew sixty-seven percent of the missions, Strategic Air Command (SAC) in the form of KC-10s flew three percent of the missions and the CRAF flew the remaining thirty percent of the missions (Lund, Berg, and Replogle 1993, 14) (Department of Defense 1992, F-29).

The standard utilization rates for airlift aircraft make two major assumptions: that all aircrews, both active and reserve are available for AMC's use and that staging facilities will be available where needed for optimal use. During Operation Desert Shield, both assumptions were wrong (Lund, Berg, and Replogle 1993, 11). AMC conducts airlift missions around the globe on a daily basis. They support US forces, humanitarian relief efforts, and numerous other missions. At the start of Desert Shield, it would have been impossible for AMC to have all of its assets located at their home base. Another shortfall of the utilization rate computation is a large portion of AMC assets, both personnel and equipment, are located in the Air National Guard and in the Air Force Reserve.

Key to US airlift capability during the Gulf War was the augmentation provided by the Air Force Reserve and the Air National Guard. Their aircraft and crews provided a total USAF airlift force of 118 of the total 126 C-5 and 195 of the 265 C-141s flown during Desert Shield. A late call-up of reservists directly affected AMC's initial capability to support airlift requirements. During Desert Shield, the Air Force called up its reserves by subunits or skill categories, rather than as whole units. This action was due to the force restrictions under the presidential call-up. The subunits lacked the command structure of whole units, causing some confusion among reservists. Not until early September of 1990 did AMC complete the activation of its reserve crews (General Accounting Office 1993, 37-40).

A major shortfall in executing strategic lift in accordance with the utilization rate computations was a lack of bases: enroute bases, off-load bases, and staging bases. Efficient strategic airlift for long distances depends on enroute staging bases. A lack of

enroute bases results in a greater reliance on air refueling and an overall decrease in payload capability. The relatively few enroute bases capable of handling the Operation Desert Shield airflow made the system highly sensitive to any disruptions at those bases, such as inclimate weather, delays in air traffic control, and ramp congestion. Three bases handled 61 percent of the airflow. The principle enroute bases were subject to heavy traffic. The bases received aircraft both going to and returning from the theater. Four bases handled 75 percent of the airflow: Torrejon (29 percent), Rhein-Main (21 percent), Zaragoza (16 percent), and Ramstein (9 percent) (General Accounting Office 1993, 4, 29-40).

In theater, off-load was largely limited to Dhahran. Saudi Arabia had many large airfields, but they did not all have the infrastructure necessary to support large airlift operations: large fuel supplies, hydrant refueling systems, and materiel handling equipment. Dhahran handled 59 percent of all airlift missions or an average of thirty-two aircraft per day (Lund, Berg, and Replogle 1993, 22). Original plans called for up to thirty-four off-load locations in an Operation Desert Shield-type scenario. However, due to physical and political restrictions, AMC was limited to ten during the operation. Off-load constraints were extremely severe during the initial weeks of Operation Desert Shield when only Dhahran was available. By the sixth week, the situation had improved with the availability of Riyadh (General Accounting Office 1993, 19). Eventually, the US expanded the airlift operation to other airports, principally King Fahd, King Khalid Military City (KKMC), and others (Department of Defense 1992, F-13, 14). Important airfield facilities outside of Saudi Arabia included the pre-position bases of Thumrait and

Masirah in Oman. Each offered long, well-established runways (Department of Defense 1992, F-14).

CENTCOM denied AMC a staging base in theater, thus precluding the possibility of crew rest in the area of operations. To counter this, AMC used three rather than two pilots per aircraft flying from Europe to Saudi Arabia and back to Europe. With an augmented crew, the crew duty day increased to twenty-four hours per day but monthly and quarterly limits did not change for pilots. This used up crew flying hours at a much higher rate. The limited availability of crews and the lack of a staging base resulted in a 20 to 25 percent reduction in strategic lift capability (General Accounting Office 1993, 29-30, 40).

An innovation of the deployment was the Desert Express. To get critical spare parts into theater quickly, a dedicated C-141 aircraft departed Charleston Air Force Base (AFB) daily. It departed daily at 1230, while parts requiring shipment had to arrive by 1030. This time dovetailed with CONUS overnight mail and air express parcel delivery schedules. This was important for maintaining combat power and readiness. It was difficult to get critical repair parts from CONUS to the combat units in the field because of three factors: backlog at the ports and airfields, intransit visibility was nonexistent, and units in theater were misusing the high priority designator "999" to request repair parts (General Accounting Office 1993, 26-27). Desert Express reduced the response time for high priority shipments from fourteen days to seventy-two hours. A similar project named European Desert Express departed Rhein Main Air Base daily (Kassing 1992, 53). Table 2 shows the total cargo (in short tons) delivered by the Desert Express/European Desert Express initiatives.

TABLE 2
DESERT EXPRESS AND EUROPEAN EXPRESS CARGO (SHORT TONS)

| | ARMY | USAF | NAVY | USMC | TOTAL | ARMY | USAF | TOTAL |
|---|---|---|---|---|---|---|---|---|
| AUG 90 | - | - | - | - | - | - | - | - |
| SEP 90 | - | - | - | - | - | - | - | - |
| OCT 90 | 2.17 | 0.27 | - | - | 2.44 | - | - | - |
| NOV 90 | 171.45 | 52.53 | 1.49 | 9.31 | 234.78 | - | - | - |
| DEC 90 | 229.31 | 124.62 | 26.32 | 17.07 | 397.32 | 19.58 | 61.55 | 81.13 |
| JAN 91 | 266.25 | 251.42 | 36.01 | 22.59 | 576.27 | 110.42 | 184.72 | 295.14 |
| FEB 92 | 274.58 | 273.74 | 39.49 | 40.88 | 628.69 | 91.17 | 168.76 | 259.93 |
| TOTAL | 943.76 | 702.58 | 103.31 | 89.85 | 1839.50 | 221.17 | 412.03 | 636.20 |

(*Conduct of the Persian Gulf War, Final Report to Congress:* Department of Defense 1992, F-33)

Operation Desert Shield was the first time in history that the CRAF was activated (General Accounting Office 1993, 15). CRAF is a program in which commercial airlines agree to make aircraft available for DOD programs in exchange for peacetime military business. Organized into three stages, it is capable, when fully activated, of executing thirty-three percent of total cargo lift capability, 57 0ercent of the patient lift requirements and 90 percent of wartime passenger lift. During the Gulf Crisis, thirty-four airlines took part in the program. CRAF's activation for Desert Shield was the first real opportunity to validate the program (Chenowith 1993, xv). US-flagged air carriers also voluntarily provided passenger and cargo airlift assets. Commercial assets delivered 27 percent of

the air cargo and 64 percent of the air passengers for Operation Desert Shield (Chenowith 1993, 1,15).

Table 3, taken from *An Assessment of Strategic Airlift Operational Efficiency,* shows the percentage of military lift aircraft not available and if the down time was for maintenance, supply or a combination of both. One of the shortfalls in airlift performance was the low average payload for the C-141. For a deployment with a critical leg of roughly 3,500 miles, published planning factors indicate a wartime payload of about twenty-six short tons. In Operation Desert Shield, the C-141 averaged only nineteen short tons, a shortfall of twenty-six percent (Kassing 1992, 2). __

TABLE 3
PERCENTAGE OF AIRCRAFT NOT AVAILABLE

| REASON | AUG | SEP | OCT | AVERAGE |
|---|---|---|---|---|
| C-5 NMC FOR MAINTENANCE | 10.7 | 18.4 | 20.6 | 16.56 |
| C-5 NMC FOR SUPPLY | 8.4 | 8.6 | 9.9 | 8.96 |
| C-5 NMC FOR BOTH MAINTENANCE & SUPPLY | 1.7 | 1.7 | 3.7 | 2.36 |
| C-5 TOTAL AIRCRAFT NMC | 20.8 | 28.7 | 34.2 | 27.87 |
| C-141 NMC FOR MAINTENANCE | 8 | 10.7 | 11.4 | 10.03 |
| C-141 NMC FOR SUPPLY | 3.7 | 4.1 | 4.0 | 3.9 |
| C-141 NMC FOR MAINTENANCE AND SUPPLY | 0.9 | 0.9 | 2.4 | 1.5 |
| C-141 TOTAL AIRCRAFT NMC | 12.6 | 15.7 | 17.8 | 15.33 |

(*Air Mobility Command's Achievements and Lessons Learned for the Future*: General Accounting Office 1993, 13)

## Sealift

Sealift was crucial for deploying forces to Saudi Arabia and for their sustainment. Military Sealift Command (MSC) used a variety of methods to accomplish their

missions. MSC employed the Ready Reserve Force (RRF), fast sealift ships, commercial contractors, and afloat pre-positioned ships.

The Ready Reserve Force (RRF) mission was to provide ships in five-, ten- or twenty-day increments depending on each ships designated readiness time. Only twelve of the initial forty-four RRF ships activated were operational within the specified time and only six of twenty-seven additional RRF ships activated were operational by their established time. Ships scheduled for five-day breakout took on the average eleven days to prepare (Conrad 1994, 57). It took an average of sixteen days to prepare ten-day ships. Prior year funding cuts for RRF maintenance and activation exercises affected their overall activation times. Once activated, and brought to operating condition, the ships performed well maintaining a 94 percent reliability rate and delivered 22 percent of the unit cargo for US forces. The advantages of roll-on and roll-off (RO-RO) and container vessels were clear. Most of the RRF consisted of break bulk ships which generally have a smaller cargo capacity and take two to three days longer than RO-Ros to load and unload. The use of containerized cargo shipments was not as widespread as it might have been during the deployment. Increased containerization could have substantially increased the throughput capability of ports in theater. Containerization presents its own set of problems that addressed later in this paper. During the Gulf War, there were no west coast ports equipped to handle containerized ammunition (Department of Defense 1992, E-10, 11).

The Military Sealift Command's fast sealift ships (FSS) had a good performance record during Operation Desert Shield. FSS ships had both RO-RO and limited container capabilities. RO-Ros have a distinct advantage over break bulk ships. They require less

time to load and unload. However, MSC controlled only eight FSS ships to support the operation. One FSS, the Antares, failed off the east coast and was towed to Spain. It was originally scheduled for major overhaul prior to the deployment. The FSS size and speed allowed the remaining seven ships to deliver more than 13 percent of the cargo moved by sealift. Although normally on ninety-six hour standby, the first FSS was ready to deploy in forty-eight hours. The typical FSS load included more than 700 Army vehicles. By comparison, 116 World War II Liberty Ships would have been required to move the same tonnage (Department of Defense 1992, E-12, 13).

Because the US maritime industry responded voluntarily and with an adequate number of vessels available for charter, there was no requirement to activate the Sealift Readiness Program (SRP) to support the deployment to the Gulf. The SRP is a contractual program that requires shipping companies that bid on MSC contracts to commit 50 percent of their cargo capacity to the program. Additionally, those ships built with construction subsidies or receiving operating subsidies are committed to the SRP (Department of Defense 1992, E-13).

When US forces began the redeployment phase, there were a total of 213 ships chartered by the USTRANSCOM. US charters carried 14 percent of all dry cargo and foreign flag charters carried 20 percent (Department of Defense 1992, E-13). Organic MSC ships moved the remaining 66 percent of the cargo moved by sea.

Military Traffic Management Command

MTMC personnel successfully managed the movement of 85 percent of unit equipment to Saudi Arabia through its ports. They operated out of 333 ports and loaded more than 945,000 pieces of equipment equaling 6.5 million measurement tons onto 564

ships bound for Saudi Arabia. At the peak of operations, MTMC activated twelve transportation units, 225 volunteers, and seventy-three individual mobilization augmentees from the Reserve components to support Operation Desert Shield. MTMC also coordinated the leasing of 37,000 forty-foot commercial containers to support the deployment to Southwest Asia. (USTRANSCOM 1999).

## Pre-positioned Equipment

The DDO had been preparing for a major expeditionary operation in the gulf since 1970 and had made numerous improvements in its expeditionary pre-positioning capabilities. Desert Shield and Desert Storm proved the value of pre-positioned equipment. Pre-positioned equipment allowed for a more rapid response by combat forces to the theater, it provided essential supplies and equipment to the early deploying forces of the US Army and US Marine Corps (Department of Defense 1992, E-14).

During the 1980s, the Army established afloat pre-positioning ships (APS) to support Southwest Asia (SWA). There were twelve ships (eight dry cargo and four tanker) in the APS program when Operation Desert Shield started. Eleven of these vessels were located at Diego Garcia with one ship in the Mediterranean Sea. This program involved the storage of cargo on four Army APSs strategically positioned to move to support CENTCOM contingencies carrying equipment, fuel, and supplies (Department of Defense 1992, E-14).

During the Gulf Crisis, these ships sailed from their forward bases in Diego Garcia. The first APS arrived on 17 August. The war reserve cargo on the first vessel included subsistence, general supplies and equipment, packaged fuel, construction and barrier material, ammunition, and medical supplies. One vessel carried port operating

equipment: tugboats, floating cranes, utility landing craft, rough terrain forklifts, containers, and support parts (Department of Defense 1992, E-14).

The USAF pre-positioned $1 billion worth of fuel, ammunition, and equipment on the Arabian Peninsula in the years prior to the crisis. The Air Force also had materiel stored on three pre-positioned ships. Pre-positioned assets stored in Oman and Bahrain, as well as on APS, included rations, munitions, medical supplies, aircraft fuel tanks, vehicles, and basic support items consisting of shelters, MHE, power generation, kitchens, water purification, and airfield support items. These bare-base support items originally designated to support 1,200 personnel at each of 14 aircraft bed-down locations eventually supported 21 locations. The increase in capability was due to host nation support (HNS) provided by the Kingdom of Saudi Arabia (Department of Defense 1992, E-14).

The Navy-USMC maritime pre-positioning program began in the late 1970s following a DOD strategic mobility enhancement initiative to improve response times for SWA. The Maritime Pre-positioning Force (MPF) concept performed as planned during the crisis. All three MPFs met their planned target of 10 days to unload ships and link their equipment with arriving units. The 7th Marine Expeditionary Battalion (MEB) combat elements occupied defensive positions near Al-Jubayl in August within four days of their arrival (Department of Defense 1992, E-15). Seventy-five percent of the MPS ships reached their Sea Ports of Debarkation in Saudi Arabia by 25 August (C+18). Table 4, shows the Marine Corps employment of MPS during the Gulf War (Kassing 1992, 29).

TABLE 4
MARINE CORPS EMPLOYMENT DURING THE GULF WAR

| UNIT | COMBAT READY | C-DAY | DEPLOYMENT OPTION |
|---|---|---|---|
| 7TH MEB | 15 AUG | C+8 | MPS |
| 13TH MEU | 7 SEP | C+31 | AMPHIBIOUS |
| 1ST MEB | 10 SEP | C+34 | MPS |
| 1MEF | 3 SEP | C+27 | MPS, AIRLIFT, SEALIFT |
| 4TH MEB | 16 SEP | C+40 | AMPHIBIOUS |
| 2D MARINE DIV | 8 JAN | C+154 | MPS, AIRLIFT, SEALIFT |
| 5TH MEB | 14 JAN | C+160 | AMPHIBIOUS |
| II MEF (AIR, CSS) | 15-Jan | C+161 | AIRLIFT, SEALIFT |

(*Getting U.S. Military Power to the Desert:* Kassing 1992, 29)

## Support From Foreign Nations

Foreign air carriers flew a number of missions with their respective governments paying the mission costs. Other governments participated by directly paying US airlines to fly for AMC. Air Alitalia flew more than twenty cargo missions between Rhein-Main and Dhahran. Korean Airlines coordinated the use of a B-747 cargo aircraft that flew from the east coast twice a week. The government of Japan chartered a US airline, Evergreen Airlines, to carry cargo (Chenoweth 1993, 55-56).

The commitment of US military personnel and equipment involved a large financial obligation. Total US incremental cost (cost that would not otherwise have been incurred) associated with deploying, operating, and supporting forces used in Operations Desert Shield and Desert Storm was estimated at $61 billion. Coalition countries committed almost $54 billion to offset these costs. Saudi Arabia agreed to provide, at no

cost to the US, all fuel, food, water, local transportation, and facilities in the country and surrounding areas. Japan committed $1.7 billion to the US' incremental costs. Other nations providing support to offset the costs were: $1 billion from Germany, $2.5 billion in cash from Kuwait, $1 billion of support composed of cash and HNS from the United Arab Emirates, $80 million from Korea. Oman, Bahrain, and Qatar also provided no-cost host nation support (HNS) (Department of Defense 1992, P-3-5).

During Operation Desert Shield, the US forces debarked into a relatively secure environment with secure ports and airfields. The infrastructure in Saudi Arabia was extensive, with well-developed sea and airports of debarkation, significant throughput capacity, materiel handling, transportation assets and road and communications networks. Years of patient and concerted effort went into bonding the US-Saudi relationship (Tiberi and Wendt 1991, 20).

## Asset Visibility

Asset visibility within the wholesale system in the US was generally adequate. However, visibility of assets while intransit to their destination and existing intheater was poor. The deployed forces lack of visibility resulted in considerable confusion and reordering. In the US, vendor shipments, especially containerized and palletized cargo were inadequately marked or documented. Even if adequately documented, pallets that contained material for several units were broken down and reconsolidated at ports and airfields for movement forward.

In-theater processing of containers also presented a major headache, for a number of reasons. One was multiple consignees for a single container. Out of the 41,000 containers shipped during Desert Shield and Desert Storm, approximately 28,000 were

opened because of mixed loads or unidentified containers. Consequently, assets were requisitioned several times when the same or like items could have been made available from stocks already in the theater. The result was a delay in satisfying the requirement, significant additional transportation cost incurred, and possibly delaying the movement of still more cargo (Pagonis and Cruikshank 1992, 206).

The Commanding General of Army Materiel Command, General William G. T. Tuttle described the situation as,

> We could get parts to the arrival ports, but there we lost asset visibility. We have done little to improve the distribution system since Vietnam, and we have seen similar though not as poor results on other occasions. We should tolerate this no longer. United Parcel Service and Federal Express can tell you precisely where your package is located in their system at any given time. Similar processes could be applied to track combat essential components or even monitor the locations of units on the battlefield. (Conrad 1994, 42)

Lack of synchronization and interoperability in automation contributed significantly to loss of visibility in transit. The major breakdown between the requesting forward units and the source of supply had several direct causes. First, the operation occurred while the Army was upgrading its automated supply requisition system. Second, most of the Army's automated reporting and supply requisitioning procedures worked well in peacetime using commercial communications systems. The lack of telephone infrastructure in Saudi Arabia quickly produced serious problems for systems designed for the US telephone system. Units deployed with automated systems whose software was incompatible with that of supporting systems, resulting in the establishment of at least twenty-six separate vertically oriented logistics databases within the theater of operations. These stovepipe systems ranged from manual to batch processing to on-line systems. At the height of the operation, the VIII Corps Materiel Management Center

(MMC) often took up to thirty hours to run its daily computer cycle. This was because the software and hardware could not keep pace with the requisition volume. These shortfalls in visibility, and accountability led to of loss customer confidence in the supply system.

## Unit and Equipment Accountability

During the Gulf War, visibility of equipment and supplies arriving in the theater was lost because of incorrect documentation procedures, continuous changes in deployment sequences, incorrect loading and shipping of containers, and lack of standardization in ADP systems--to say nothing of the magnitude and complexity of the operation itself. Many units loaded their equipment on multiple vessels causing an accountability problem in Saudi Arabia. The deployment forced CENTCOM to use a manual system to monitor the force planning process. Lack of automation, along with revisions in unit movement sequences and frontloading of combat units at the cost of deploying key logistics units, produced an austere combat Service support environment throughout the operation.

## Reception, Staging, Onward Movement, and Integration

The reception, staging, onward movement, and integration (RSO&I) phase of a deployment is the responsibility of the theater commander. The problem with receiving forces in Saudi Arabia was there were no US forces permanently assigned in theater to perform this mission. At the start of Operation Desert Shield, the primary focus was getting combat forces on the ground as quickly as possible to deter a possible Iraqi invasion into Saudi Arabia.

Since combat units arrived in Saudi Arabia before their support elements, the small group of logisticians that landed on 8 August 1990 from Army Central Command (ARCENT) Headquarters became the nucleus of all logistic support. Shortly after the arrival at Dhahran of the first elements of the 82nd Airborne Division, the decision was made that a support command was required to control all logistics support. The basis for the decision was the fact that the Army lacked the required logistics infrastructure needed to feed, shelter, and supply the larger number of soldiers arriving. The airfield at Dhahran and the ports at Ad Dammam and Al Jubayl became the aerial port of debarkation and the sea port of debarkation respectively. An area support group (ASG) and an area support battalion were quickly formed and elements of the 7th Transportation Group from Fort Eustis that arrived on 12 August immediately began planning to receive equipment at the ports. The Support Command (SUPCOM) Headquarters initially consisted of only two elements, a command element and a logistical operations center (LOC). A handful of logisticians and in-theater liaison officers from each unit that arrived initially operated the LOC. They enlarged their operation by borrowing military manpower from arriving units. Another 18 hand picked logisticians arrived on 14 August from the US to join the group (Pagonis and Cruikshank 1992, 98-102).

On 18 August, Army Central Command (ARCENT) formally established the ARCENT Support Command (SUPCOM) (Provisional). On 27 August, a general staff was formed, augmented by soldiers from ARCENT. Their mission was to deploy and organize the HNS to receive and move onward soldiers and marines entering the theater. They coordinated for further development of the US-Saudi support infrastructure. The ARCENT Support Command (SUPCOM) developed from a zero base using arriving US

units and cadre with host nation elements and matured into a combined US - Saudi Arabia support structure that provided theater wide logistics support for the RSO&I of US and combined forces (Pagonis and Cruikshank 1992, 122).

When the 82nd Airborne Division initially arrived in the 130-degree heat in early August there were no A-rations (hot meals), little water, no sanitary facilities and no postal support. By the end of August, the mechanisms were in place to start providing: shelter, food, water, transportation, sanitation, and postal services. A key element was the HNS structure and contracting effort. The LOC coordinated with the Saudi government to acquire fresh fruit, bottled water, food, transportation, and billeting. By 30 September, there were 72,000 troops in theater. One month later, there were 97,000 troops. By the end of December, the 22nd Support Command (SUPCOM) and 1st & 2nd Corps Support Commands (COSCOM) had received over 221,000 troops and over 769,000 tons of equipment (Shrader 1997, 562-563).

## Operation Desert Shield Summary

The CRAF, afloat pre-positioning, port operations, strategic airlift (organic and commercial), strategic sealift, and the RRF, once activated worked extremely well. The war highlighted the tremendous capability of RO-RO vessels. Enroute staging bases in Europe were critical to strategic airlift. DOD needed to renew its planning efforts and enforce JOPES training in peacetime so users would be prepared to operate the system in war. USTRANSCOM and its component commands needed to push for containerization and intransit visibility in DOD. Operation Desert Shield convinced USTRANSCOM that the C-17 aircraft would improve the strategic lift capability of the US. A combination of the RRF vessels and US flag fleet ships is vital to meeting strategic sealift requirements.

Postwar studies have identified a need to increase afloat pre-positioning to meet initial requirements. Operation Desert Shield identified the need to improve the procedures for activating reserve transportation units prior the 200,000 troop Presidential call up (Mathews and Hold 1996, 42). To avoid future planning problems encountered during Operation Desert Shield, established OPLANs must have valid TPFDD. Units must ensure TPFDD currency. The TPFDD must be validated early in the deployment and changes must be limited. For the joint chain of command to maintain visibility over the deployment, they needed to go directly to USTRANSCOM with their lift requests. They could enhance intransit visibility, speed delivery, and avoid backlogs at ports by following military standard transportation and movement procedures and by establishing airlift cargo allocation and priority systems and adhering to them. Early and accurate requirements forecasting would allow USTRANSCOM to schedule the most appropriate forms of lift against user requirements for force closure and sustainment. In general, deployment discipline would increase effectiveness and improve efficiency (Mathews and Hold 1996, 46). With oversight of the entire transportation operation and authority to manage it, USTRANSCOM employed personnel, aircraft, ships, trains, trucks, and port assets to meet the customers' requirements. To smooth transition from peacetime operations to a wartime footing, USTRANSCOM needed to have the same roles, responsibilities, and authority in peacetime as it had in war. Authorities not granted to USTRANSCOM in peace as in war included operational control of the three component commands, charter to act as the single manager of all lift assets, and charter to be the single traffic manager.

## The Twenty-First Century

The DOD is engaged in a dedicated effort to determine how it will fight in the twenty-first century. The transition began in 1989 when the collapse of the Soviet Union and the removal of the Berlin Wall made the US the only superpower. A reduction in the perceived threat led Congress to think in terms of reducing expenditures associated with the military and the need for national security. Military manpower, installation infrastructure, civilian personnel, and hardware acquisition became a bill payer for the peace dividend.

The changing global situation significantly modified the cold war method of doing business. The term military operations other than war (MOOTW) came into existence. As the size of America's overseas military decreases, the number of operations in foreign lands is increasing. Threats to America's security are changing. America's *National Security Strategy for a New Century* addresses three challenges for the military: "responding to transnational threats, smaller small contingencies, and major theater war." The associated national military objectives include: "promoting stability through regional cooperation, constructive interaction, thwarting aggression through credible deterrence, and maintaining a robust warfighting capabilities (Whitehouse 1997, 10-12).

## US Transportation Command

On 8 January 1993, DOD Directive 5158.4 changed the mission of the US Transportation Command to provide air, land, and sea transportation for the Department of Defense, both in time of peace and war. This charter greatly expanded USTRANSCOM's authority. It assigned the Military Airlift Command, Military Sealift Command and the Military Traffic Management Command to USTRANSCOM. The

charter also made the CINC of USTRANSCOM the DOD single manager for transportation other than Service unique and theater assigned transportation assets. The USTRANSCOM CINC was delegated the authority to procure commercial transportation Services, including the authority to lease transportation assets, and in concert with the Secretary of Defense activate the CRAF, RRF, and the Voluntary Intermodal Sealift Agreement (VISA) program (Mathews and Hold 1996, 46).

## Strategic Airlift

In the year 2010 and beyond, strategic air mobility will continue to be a high demand resource in support of peacetime and contingency operations. Airlift will remain essential to power projection, force sustainment, and operations other than war. Airlift and tanker aircraft form the fast component of transportation required to deliver time critical forces and supplies (Joint Chiefs of Staff J4 1997, 7-9).

In fiscal year 2006, AMC will complete the retirement of the C-141 fleet. While the purchase of 137 new C-17 aircraft replaces the cargo carrying capacity lost by the C-141 retirement, the significant decline in total number of airlift aircraft will require innovation to meet some customer requirements. The 137 C-17 aircraft replace a total of 285 C-141. It is not a major factor when the airlift effort is concentrated on one theater but becomes a factor in the day-to-day mission of the Air Force. Air Force C-17s can haul more total cargo than the C-141s but they are limited as to how many locations they can support simultaneously. The current mission capable rate for the C-17 for 1998 was 95 percent. (Jordan). If the US had C-17 aircraft instead of the C-141s during Desert Shield and Desert Storm, AMC could have met their airlift deployment requirements 25

to 30 percent faster. It would have improved the throughput by 41 percent by using smaller airfields located forward in the area of operations (Koss 1998, 1).

The KC-135 will provide the majority of air refueling capability and will serve as AMC's core tanker well past 2010. The KC-10 is capable of simultaneously supporting aircraft deployment and cargo transport with a projected Service life to 2043 (Koss 1998, 1). The C-5 Galaxy is able to carry oversized loads such as tanks from the continental US to a theater half a world away. However, aircraft mission capable rates hamper future reliance on the C-5. The C-5 has been part of the Air Force fleet since the early 1970s and is in need of upgraded avionics and new engines. The Air Force requires the C-5 to operate at seventy-five percent to meet the airlift requirement needs of two major theater wars; the mission capable rate for 1998 was sixty-one percent. Between 2001 and 2004, the 125 Galaxies will be retrofitted with a new avionics system. The Air Force is not currently able to use the most efficient air routes because their planes lack certain types of required global-positioning satellite systems and collision avoidance technology. The avionics retrofit will correct one of these deficiencies. The new engine requirement identified through an AMC study in 1994 has not progressed further (Jordan 1999, 6-17).

In 1999, the General Accounting Office (GAO) validated Air Force and Navy claims of critical pilot shortages. According to the GAO, the Air Force is currently short 2,100 pilots and the Navy 1,100. However, GAO notes that 2,700 of the Air Force's 13,300 pilots and 1,450 of the Navy's 7700 pilots have desk jobs. In its report to the House Armed Services Personnel Subcommittee, the GAO was unable to conclude why those jobs, which include tasks such as planning deployments and advising on new

aircraft and aircraft systems, required pilots to fill them. GAO concluded, "If the jobs were filled by a range of nonpilots, pilots could return to flying."

While the Navy had no comment, the Air Force pointed to professional development for pilots among other reasons for having pilots in nonflying positions. USTRANSCOM estimates by fiscal year 2002, the Air Force will be almost 2,000 pilots short of the number needed to fill available cockpits (House Armed Services Subcommitte 1999).

As the twenty-first century begins, the CRAF design has three main segments: international, national, and aeromedical evacuation. The long-range international section employed to support transoceanic operations consists of passenger and cargo aircraft. The role of these aircraft is to augment the Air Mobility Command's long-range intertheater C-141s, C-5s, and C-17s during periods of increased airlift needs. The aeromedical evacuation segment is designed to assist in the evacuation of casualties from operational theaters to hospitals in the continental US. Kits containing litter stanchions, litters and other aeromedical equipment convert civil B-767 passenger aircraft into air ambulances (Civil Reserve Air Fleet 1999).

To provide incentives for civil carriers to commit these aircraft to the CRAF program and to assure the US of adequate airlift reserves, AMC awards peacetime airlift contracts to civilian airlines that offer aircraft to CRAF. The International Airlift Services contract in 1999 contained a guaranteed $342 million. AMC estimates that throughout fiscal year 1999, it will also award more than $362 million in additional business to CRAF participants. Aircraft committed to the CRAF program must be US registered, capable of over-water operations, have a 3,500 nautical mile range and 10

hours per day utilization rate. Carriers must also commit and maintain at least four complete crews for each aircraft (CRAF Fact Sheet 1999).

As of 1 October 1998, CRAF totaled 494 aircraft enrolled in the long-range international segment. When notified of call-up, the carrier response-time to have its aircraft ready for a CRAF mission is 24 to 48 hours after AMC assigns the mission. The air carriers continue to operate and maintain the aircraft with their own internal resources. Table 4 list those the air carriers enrolled in the Long-Range International Section of CRAF.

TABLE 5
CARRIERS ENROLLED IN CRAF

| | | |
|---|---|---|
| Air Transport International | American international Airways | American Airlines |
| American Trans Air | Arrow Air | Continental Airlines |
| Delta Airlines * | DHL Airways | Emery Worldwide |
| Evergreen International | Federal Express Airlines | Fine Airlines |
| Northwest Airlines | North American Airlines | Polar Air Cargo |
| Sun Country Airlines | Tower Air | United Airlines |
| United Parcel Service | Trans Continental Airlines | World Airways |
| US Air * | | |

* Denotes these airlines also provide aircraft to the Aeromedical Evacuation Segment (*Civil Reserve Air Fleet Fact Sheet:* Civil Reserve Air Fleet1999, 1)

In March of 1999, General Charleston T. Robertson Jr., the CINC of USTRANSCOM, testified before Congress that AMC is facing several readiness

problems. The current mission capable rate for the C-5 aircraft is 61 percent; the AMC goal is 75 percent. This 14 percent mission capable rate difference represents thirty-two lost C-5 missions per day. Cannibalization rates for spare parts are up 33 percent since 1995 and 20 percent since September 1988. The 1994 Mobility Requirements Study established an airlift goal of 49.7 million-ton-miles per day (MTM/D) to meet the nation's two nearly simultaneous MTWs. Based on maintenance data, AMC falls 5.43 MTM/D short of that goal. According to General Robertson, by 2006, if the C-5 reliability problems remain uncorrected, the net loss for a regional warfighting CINC over a thirty-day period could translate into losing the capabilities of all of the following: one light infantry division, one airborne brigade, three attack helicopter battalions, and three fighter squadrons (House Armed Services Subcommittee 1999).

## Sealift

Military Sealift Command continues to provide ocean transport of equipment, fuel, supplies, and ammunition to sustain US forces worldwide during peacetime and in war. During a war, more than 95 percent of all equipment and supplies needed to sustain the US military will move by sea. The command operates ships for US Navy fleet support, provides special ocean missions support to US government agencies, pre-positions US military supplies and equipment at sea, and provides ocean transportation for defense cargo in both peacetime and war. The MSC manages five programs: the Navy fleet auxiliary force (NFAF), special missions, ship introduction, the sealift program and afloat pre-positioning (Military Sealift Command 1999).

The Navy fleet auxiliary force (NFAF) consists of more than thirty-five ships and provides direct support for Navy combatant ships at sea. This allows them to remain at

sea for extended periods. NFAF ships perform underway replenishment services for Navy battle groups to include the delivery of food, fuel, spare parts, and ammunition. NFAF ships are crewed by civil service mariners. Each ship carries a naval detachment ranging in size from four to forty-five people. In addition to logistics operations, the NFAF has two hospital ships, the Comfort and the Mercy. They are designed to provide emergency on-site medical care for our US forces during a war or contingency operation. These hospital ships each contain twelve operating rooms and a 1,000 bed hospital facility (Military Sealift Command 1999).

The special missions program is the smallest of the MSC programs and is comprised of approximately thirty ships. These ships carry out a wide variety of highly specialized missions including oceanographic surveys, missile tracking, costal surveys, cable laying and repair, submarine escort, deep submergence rescue support and other unique Navy operations (Military Sealift Command 1999).

The ship introduction program is responsible for overseeing MSC's ship acquisitions, including combatant Navy fleet ship transfers, new ship construction and existing ship conversions. The program is especially important as MSC continues to acquire combat logistics force ships from the active duty Navy. This program is also responsible for adding nineteen large medium speed, RO-RO ships or LMSRs by the year 2001. The LMSRs are a part of a strategic sealift enhancement program that began 1992 following the Persian Gulf War. The congressionally mandated defense mobilities requirements study highlighted the need for an additional 3 million square feet of surge sealift and 2 million square feet of pre-positioning sealift. The nineteen LMSRs will compensate for this shortfall. Five LMSRs are conversions from commercial vessels, and

the remaining fourteen are being built from the keel up (Military Sealift Command; 1999).

The sealift program is responsible for a fleet of tankers and dry cargo ships that move DOD cargo during peacetime and war. In addition, the program oversees MSC's activation and operation of other ships kept in reserve including eight fast sealift ships (FSS) and more than ninety RRF (RRF) ships. For surge sealift, MSC first looks to the US market to charter ships as mandated by law. If unavailable government owned FSS or RRF ships may be activated (Military Sealift Command 1999).

The RRF is a key element of strategic sealift, specifically structured to transport Army and Marine Corps unit equipment and initial resupply for forces deploying. The current total for the RRF is ninety-four ships. This consists of thirty-five breakbulk ships, thirty-one RO-RO vessels, three heavy lift ships, nine auxiliary crane ships, ten tankers, and two troopships. Each RRF ship is maintained in a specific four, five, ten or twenty 20 day readiness status by the Maritime Administration (MARAD) at a reserve fleet site or designated out-port. Approximately one-third of the ninety-four RRF ships are moored at one of three reserve fleet sites: James River, Virginia, Beaumont, Texas, or Suisun Bay, California. The remainder of the fleet is berthed at various US and foreign ports. No-notice activations test the readiness of the RRF for military cargo operations and exercises. During the Haitian crisis, fourteen ships were activated within an average of 3.1 days when they were required within an average of 4.8 days. The RRF currently is retiring breakbulk vessels and replacing them with eleven new LMSR RO-ROs. USTRANSCOM predicts that a surge sealift shortfall (in accordance with the 1994/1995 *Mobility Requirements Study Bottom Up Review Update*) of 400,000 square feet will

exist in 2001. Under the current plan, the commercial sector under the VISA will make up the difference in surge sealift requirements (House Armed Services Subcommittee 1999).

VISA is a program developed by USTRANSCOM, the Maritime Administration (MARAD), and the shipping industry. It leverages government business in exchange for sealift capability. It is the sealift companion to CRAF. The objective is to leverage commercial sealift capacity, vessels, crew, port facilities and other commercial assets in contingency as opposed to leveraging only ships in the past. The 1996 Maritime Security Act required the Secretary of Transportation to establish a program that retains a fleet of US flagged, militarily useful vessels to meet national security requirements and maintain a US presence in international commercial shipping. In addition, the act requires vessels to enroll in VISA (Military Sealift Command 1999).

Under VISA, US flag carriers contractually commit to provide contingency ship capacity and intermodal resources in return for preference for DOD peacetime business. Like CRAF, VISA contains three distinct stages indicating the level of civil sector commitment (House Armed Services Subcommittee 1999).

MSC also manages afloat pre-positioning. The successful deployment of US military forces in the twenty-first century depends on their ability to act quickly. In an unstable world where regional hostilities may break out at any time, MSC's pre-positioning ships provide a fast, powerful military response anywhere in the world. The program has thirty-two strategically located ships loaded with military equipment and supplies for the Army, Air Force, Navy, and Marine Corps (Military Sealift Command; Pre-positioning 1999). Since Operation Desert Shield, USTRANSCOM has increased

the afloat pre-positioning capacity to ninety percent of the requirements outlined in the Mobility Requirements Study (MRS). Forecasts estimate that afloat pre-positioned equipment will meet the MRS requirements in 2001 with the addition of eight new LMSRs into the fleet (House Armed Services Subcommittee 1999).

## Pre-positioned Equipment

The Army's goal for pre-positioning is to establish eight brigade sets, seven of which are currently in place. Table 5 shows the status of the Army's pre-positioned program by location and combat systems. Each brigade set contains tanks, Bradley fighting vehicles, artillery pieces, trucks, and other equipment to support three to four battalions of combat troops or approximately 3,000 to 5,000 troops. Of the brigades, six are ashore and one is afloat. Three of the six are in Europe while the other three are in Kuwait, Qatar, and Korea. The Army currently plans to add another afloat brigade 2001.

TABLE 6
1999 US ARMY PRE-POSITIONED EQUIPMENT STATUS

| LOCATION | M1A1 TANKS | M109 HOWITZERS | BRADLEYS |
|---|---|---|---|
| Kuwait | 116 | 18 | 58 |
| Qatar | 116 | 18 | 58 |
| Korea | 116 | 18 | 68 |
| Europe | 232 | 36 | 116 |
| Afloat | 123 | 18 | 116 |

(*Military Pre-positioning, Army and Air Force Programs:* General Accounting Office 1998, 14)

An exercise in Kuwait in 1998 confirmed the readiness of the Kuwait brigade set. Of the 1,700 pieces of pre-positioned equipment issued to Army troops in February 1998,

only four pieces did not work properly. In May 1998, forces arrived in Kuwait, unloaded their planes, drew materiel, and moved to the field within sixteen hours.

The Air Force pre-positioning program includes bare base sets, vehicles, munitions, and a variety of consumable stocks such as rations, fuel, and support equipment. These programs are to initiate and maintain flight operations until supply channels are established. The Air Force's bare-base program comprises air transportable sets of equipment to quickly establish or augment air bases worldwide. Equipment in the sets includes tents, latrines, kitchens, aircraft hangers, maintenance shops, generators, and environmental control units. These sets are especially critical in austere environments. The Air Force also prepositions munitions on land and on three sips.

The Marine Corps relies heavily on pre-positioned equipment, while the Navy has a relatively small program because it tends to deploy with most needed equipment on its ships. The top priority in the Marine Corps and the Navy pre-positioning programs is the maritime pre-positioning force (MPF). This force consists of equipment and supplies pre-positioned on a fleet of thirteen ships. The fleet organized into three squadrons which are anchored afloat at Guam, Diego Garcia, and in the Mediterranean. Each squadron is designed to support and sustain 17,000 marines and 2,100 naval personnel for thirty days. According to the Marine Corps, these ships carry much of what the expeditionary forces need for initial operations, including tanks, personnel carriers, ammunition, food, and spare parts. The force also contains Navy equipment, including construction equipment, and crafts used for off-loading and ferrying equipment and supplies ashore, among other items. The force is being expanded by adding two ships to the fleet. The extra space afforded by the expansion will allow the marines to add or

augment existing capability in two of its squadrons. Additions will include an expeditionary airfield and a fleet hospital (General Accounting Office 1998, 1-15).

## Military Traffic Management Command

Today, as during Desert Shield, the Military Traffic Management Command (MTMC) continues serve as the link between DOD shippers and commercials to include those in the tucking and rail industries. During contingencies, MTMC sends teams to manage additional ports. MTMC stages cargo, plans, and directs loading and unloading, and documents cargo movement. MTMC also evaluates worldwide transportation systems to determine capabilities and shortfalls to support contingency operations. The command develops automated methods of documenting and tracking cargo movement at every stages to provide Intransit visibility through the global transportation network (GTN). The deployability engineering section of MTMC analyzes installation infrastructures and transportations systems, conducts unit and force deployability studies and evaluates logistics exercises to improve the force deployment structure within CONUS (MTMC 1999, 2-5).

## Support From Other Nations

The US must consider regional alliances as a partial solution to a limited forward presence. An ally in place, even without sufficient force to defend itself, perhaps can muster enough resistance to delay the enemy. Such allies can provide receiving facilities to US forces. In the future, the US cannot depend on such favorable conditions as it had in Saudi Arabia. America should no more feel certain that other nations will provide it with strategic lift or financial support than it should feel certain they will fight alongside them. It is important that the US be well prepared to deploy and fight in a more austere

environment than encountered in Saudi. The US must consider regional alliances as a partial solution to a limited forward presence. Such allies can provide receiving facilities to US forces (Tiberi and Wendt 1991, 20).

Because the US no longer enjoys prominent forward-basing, a joint force must possess a base of operations to build and further project combat power. Power projection means getting into theater quickly with a force that can make a difference. America succeeded in the Gulf because their adversary allowed them the time to conduct a massive buildup of military and logistic power that was overwhelming. It is unlikely any future adversary will be so unwise to allow the US to do that again. To be effective, joint forces must plan for the worst-case scenario of a non-permissive entry. The US must maintain a capability to introduce initial entry forces that can secure and hold ports and airfields that will provide follow-on forces with a point of debarkation (*JFQ,* spring 1996, 84). These forces and capabilities currently exist in the form of airborne assault, joint logistics over the shore (JLOTS), naval expeditionary forces, the marine air-ground task forces (MAGTF), and the air expeditionary forces (AEF).

Joint Logistics Over the Shore

Although high priority units may send equipment by air, the vast majority of units will deploy only troops by air while their equipment arrives by sea. All equipment afloat must pass through a seaport of debarkation. The port will fall into one of three categories: a good port with plenty of berthing for deep draft ships, a restricted port that has been damaged or lacks the capacity to throughput large amounts of materiel, or no port at all.

When facing a restricted port or no port at all, regional CINCs have identified joint logistics over the shore (JLOTS) as a required capability to support their operations and contingency plans. To ensure adequate JLOTS capability, USTRANSCOM is focusing on two major initiatives, equipment and training. The equipment includes RO-RO discharge and causeway platforms that greatly facilitate vehicle off loading. The lack of platforms force a lift-off, lift-on operation, extending offload of a ship by 600 percent. Developments are currently under way to allow JLOTS operations to be conducted in rough seas. USTRANSCOM continues to work to develop adequate levels of training that will ensure peak proficiency. USTRANSCOM coordinated and finalized DOD training that incorporates and exercises service JLOTS forces during the JCS exercise program. The program running through 2003 ensures readiness to conduct JLOTS operations whenever and wherever needed. DOD allocates $15 million each year for one dry and one liquid cargo exercise. These exercises rotate between the theaters (Koss 1998, 59-60).

Plans are under way to increase the capability of delivering forces through Sea State 2 (SS2) to Sea State 3 (SS3) and able to deliver this capability to the theater when port throughput is insufficient. Sea State 2 includes wave heights of 1.5 to 3.0 feet and wind 5.0 to 12.7 knots. Sea State 3 includes wave heights of 3.5 to 5.0 feet and wind speeds of between 13.7 and 16.4 ( Joint Chiefs of Staff 1997, 10). Estimates predict this JLOTS issue will be solved by 2005. The addition of advanced causeway and crane systems will fulfill CINC's throughput requirements. Navy and Army forces will use their unique watercraft capabilities to support Marine and Army combat forces ashore, executing independent and joint missions. When large force deployments are required

for major conflicts, JLOTS forces will assist in the reception of those forces. Theaters with ports having the most advanced capabilities will employ JLOTS forces to augment port reception to handle the surge of major combat formations and their continuous sustainment. JLOTS forces allow the discharge of even the largest ships, regardless of a port's capability to receive them (Koss 1998, 61).

## Innovations for the Twenty-First Century

There are numerous projects under development to support joint deployment in the twenty-first century. These projects include: doctrine development, improvements in automation, communications, and command and control, and technology. This section addresses only a few of the projects currently being developed to support the military of the twenty-first century.

### Doctrine

As with any military operation, doctrine is the foundation for mission success. To support joint deployment and JV 2010, the DOD developed the joint deployment training center (JDTC) at Fort Eustis, Virginia. The JDTC provides common deployment experiences and training to facilitate team building among the services. Its mission is to improve the deployment process through doctrinal developments, education, and training. The center teaches joint deployment and transportation core materiel. Joint deployment and transportation education will be based on doctrine that will, at the same time, maintain service unique capabilities. The intent is to create common mission based requirements that each service understands. JDTC works to standardize instruction and develop doctrine related to joint deployment and transportation. It provides a core of joint deployment and transportation doctrine for all services (Koss 1998, 59- 60).

## Global Command and Control System

In 1992, the Under Secretary of Defense (Acquisition) directed that a new acquisition approach be used to fulfill critical command and control mission needs. Subsequently, the global command and control system (GCCS) became the choice for defense-wide command and control systems. GCCS evolved from an initial baseline of existing command and control components and commercial off-the-shelf technology. GCCS is composed of several mission applications built into a single common operating environment, networked to support sharing, displaying, and passing of information and data bases. The GCCS infrastructure supports a communications capability providing data transfer facilities among workstations and servers. The secret internet protocol router network (SIPRNET) provides connectivity between GCCS sites. The baseline GCCS architecture consists of a group of regional databases and application servers. At each GCCS site, one application server is configured as the executive manager providing LAN desktop Services. There are two groups of GCCS software applications: common operating environment (COE) and mission applications. The COE provides a standard environment of commercial off-the-shelf software and a set of programming standards that describe in detail how mission applications will operate in the GCCS environment. Among the many mission applications contained in GCCS are: the joint operation planning and execution system (JOPES); the joint flow and analysis system for transportation; the requirements development and analysis (RDA), joint maritime command information system (JMICS), and the GTN (Joint Deployment Training Center 1999, 13).

JOPES is the integrated command and control system used to plan and execute joint military operations. It is a combination of joint policies, procedures, personnel, training and reporting structure supported by automated data processing on GCCS. The capabilities of the JOPES mission applications support translation of the national command authority's policy decisions into planning and execution of joint military operations. As part of JOPES, the requirements development and analysis application creates, analyzes, and edits the TPFDD.

The joint maritime command information system (JMCIS) provides near real time sea and air tracks. The joint flow and analysis system for transportation (JFAST) is an analysis tool that provides users the ability to determine transportation feasibility of an OPLAN or course of action (COA).

## Global Transportation Network

USTRANSCOM's GTN vision is to gather the family of transportation customers and providers of lift into a single integrated network that will provide intransit visibility (ITV) and the command and control capabilities necessary to support their needs. GTN supports the USTRANSCOM vision and implements the chartered tasking to integrate deployment-related automated data processing (ADP) systems. GTN will provide customer information to lift providers so they can proactively support the stated needs of defense transportation system (DTS) customers. Likewise, GTN will provide customers with information to better manage their warfighting and logistics situation. GTN will integrate the current process of satisfying transportation requirements in peace and war using DOD (primarily DTS) and commercial automated transportation systems. Many organizations, from both the DOD and the commercial industry, are responsible for

managing their existing and future automated systems and needs. USTRANSCOM is responsible for ensuring those DOD and, to the maximum extent, commercial industry automated transportation systems are developed, integrated, and maintained to support the transportation community as effectively and efficiently as possible.

Electronic commerce (EC) and electronic data interchange (EDI) will provide ITV of DOD cargo moving via commercial carrier, which is estimated to be between 60 and 80 percent of all DTS movements. GTN will collect data from source systems into an integrated database and provide ITV, command and control, and business operations applications and information to support the national command authorities (NCA), CINCs, the military services, and other DOD customers. ITV refers to the ability to track the identity, status, and location of DOD unit and non-unit cargo, passengers, patients, forces, and military and commercial airlift, sealift, and surface assets from origin to destination, during peace, contingencies, and war. GTN greatly enhances theater distribution and joint total asset visibility capabilities.

## Theater Distribution

Theater distribution (TD) is a comprehensive, distribution system for deployment, sustainment, and redeployment of units, personnel, materiel, and equipment to and from designated points of need. TD capitalizes on technology and commercial business practices to enable combat service support operators to maintain total situational awareness. Current technologies include joint total asset visibility (JTAV), intransit visibility (ITV), automatic identification technology (AIT), and movement tracking systems (MTS). Total asset visibility (TAV) provides the capability to provide timely and accurate information on the location, movement, status, and identity of units,

personnel, equipment and supplies. TAV also includes the ability to provide timely and accurate status on requisitions. The need for TAV recognized during Desert Shield and is based on two key factors, military readiness and the cost of providing logistics support to operating forces. One of the major barriers to TAV was the absence of visibility of the location and status of in-theater logistics assets. To overcome this barrier, the joint total asset visibility (JTAV) office proposed the development of a joint task force logistics management JTAV to provide an in-theater TAV capability. The information in JTAV would enhance planning for deployment, reception and onward movement of forces and materiel; the diversion of forces and materiel in-transit, if required; distribution; and the redeployment of forces and retrograde of materiel. JTAV will provide Theater CINCs, JTF Commanders, and deploying forces with materiel and personnel asset visibility (Joint Total Asset Visibility) (Joint Chiefs of Staff J4,13-15).

Joint Reception, Staging, Onward Movement, and Integration

Joint reception, staging, onward movement, and integration (JRSOI) is a phase of joint force projection occurring in the operational area. It remains the essential process required to transition arriving personnel and equipment into forces capable of meeting operational requirements. The Army is the lead service in writing Joint Publication 4-01.8, *Joint Reception, Staging, Onward Movement, and Integration.* USTRANSCOM and the services are designated as technical review authorities.

Revolution in Military Affairs

The DOD is examining innovative measures to meet the challenges of the twenty-first century. The Revolution in Military Affairs (RMA) has three components: technological innovation, operational innovation, and organizational innovation. JV

2010 call for dynamic changes by accelerating rates of change will make the future environment more unpredictable and less stable, presenting our armed forces with a wide range of plausible futures. How the US responds to dynamic changes concerning potential adversaries, technological advances and their implications, and the emerging importance for information superiority will dramatically impact how well the US Armed Forces can perform its duties in 2010. Advancing technology trends and successful adaptation of new and improved technologies will greatly increase some specific capabilities. Long-range precision capability, combined with a wide range of delivery systems, is emerging as a key factor in future warfare. The ability to produce a broader range of potential weapons effects, from less lethal to hard target kill, from sensor-fused to direct energy weapons will enhance precision capability. The combination of these technology trends will provide an order of magnitude improvement in lethality. This strategic improvement enables rapid power projection and reduces the logistics tail. Operationally, within the theater, these capabilities will mean a more rapid transition from deployment to full operational capability. As a result, we will improve our capability for rapid, worldwide deployment while becoming even more tactically mobile and lethal (Chairman, Joint Chiefs of Staff 1996, 8-16).

Twenty-First Century Summary

The DOD identified many key force projection shortfalls during Operation Desert Shield. DOD and the respective services have placed a high priority on correcting them. The addition of the C-17 increases the million ton miles per day capability of AMC. The C-17 Globemaster maintains a significantly higher operational rate than the C-141. The services are developing fixes to cure their pilot shortages. The proposed fixes include

flying bonuses and increasing the size of pilot training classes. The civilian augmentation to military strategic lift is a strong and viable program. The CRAF, RRF, and VISA programs cover the shortages of DOD owned strategic lift. Pre-positioning has improved greatly in the last ten years. Joint logistics over the shore adds a capability to put forces ashore more efficiently. Doctrine is underdevelopment to support joint deployment in the twenty-first century. Technology will greatly enhance the military's capability to maintain total asset visibility over both troops and equipment. Technological advances also increase our communications, command and control, information operations, and intelligence capabilities.

Comparison of Operation Desert Shield and the Twenty-First Century

This section reviews the force projection assets that supported Desert Shield and compares them to the DOD's force projection capability in the year 2010.

In the twenty-first century, as in Operation Desert Shield, strategic lift will play a vital role in protecting America's national interests. The US will rely on three methods to project its CONUS-based force into the theater of operations. The initial push to get combat power into place will rely on strategic air and pre-positioned equipment. Follow on forces will continue to use airlift, but will add sealift as a mode of transportation.

DOD Directive 5158.4 greatly enhanced USTRANSCOM's ability to command and control force projection assets. By conducting operations in peacetime in the same manner it conducts operations during contingencies, USTRANSCOM improved its operational efficiency. Since Desert Shield, USTRANSCOM has matured from a relatively new command to an experienced organization.

During Operation Desert Shield, the US relied on C-5 and C-141 aircraft to move forces from CONUS and Europe to Saudi Arabia. The performance of the C-141 was less than expected in terms of lift capability and operational readiness. By 2006, the C-141 will be retired from active service. The addition of the C-17 adds a tremendous lift capability to AMC. The C-17 has four distinct advantages over the C-141: the C-17 can carry the M1A2 main battle tank; it can land and takeoff on shorter, less improved runways; the lift capability of the C-17 is greater than the C-141; and the operational rate is higher than the C-141. The downside to the C-17 replacing the C-141 is the reduction in the number of aircraft available and AMC's capability to provide support to missions outside of the MTW area of operations. AMC's capability to support geographically separate locations simultaneously is reduced by 148 aircraft. CRAF continues in the twenty-first century to be a great asset to force projection. Since Desert Shield the number of aircraft enrolled in the long distance international program has increased by nearly 100 planes.

Military Sealift Command (MSC) accomplished a magnificent feat in supporting Operation Desert Shield. With the addition of nineteen LMSRs, MSC has increased its ability to provide sealift to US forces. The nineteen LMSRs add three million square feet of surge sealift capability. No-notice activations of the RRF have helped to increase its readiness. VISA was established by the 1996 Maritime Security Act. The legislation established a program for sealift that is similar to the AMC's CRAF program. Under VISA, US flag carriers contractually commit to provide contingency ship capacity and intermodal resources in return for preference in DOD's peacetime transportation contracting.

During the Gulf War, the USMC's maritime pre-positioning force performed well and validated the concept of maintaining pre-positioned equipment. The only other service to have pre-positioned assets was the USAF. The Air Force positioned fuel, ammunition, and equipment in Oman and Bahrain, and maintained rations, munitions, medical supplies, aircraft fuel tanks, vehicles, and basic support items on ships afloat. DOD currently maintains a large pre-positioned force. The Army maintains seven pre-positioned brigades, three in Europe and one each in Kuwait, Qatar, and Korea, and one afloat. The Marine Corps, Navy, and Air Force also maintain a large stock of equipment and supplies afloat. The Army plans to add another brigade afloat in 2001.

# CHAPTER 5

# CONCLUSIONS AND RECOMMENDATIONS

## Chapter Focus

This chapter answers the primary and secondary questions of this thesis. The opening of the chapter attempts to describe the state of the world in 2010. Chapter 5 then answers the secondary questions and concludes by addressing the primary question.

## The State of the World In 2010

The US in cooperation with other nations will continue to pursue peaceful relations and economic freedom. Although the US cannot know all the challenges that will arise in the future, it does know that past trends indicate that America's national interests will be challenged. In the early twenty-first century, as in today's world, the US must have the capability to protect and defend its national interests and be prepared to support their allies

The world of the twenty-first century will be more crowded, more polluted, less stable (both economically and ecologically), and more vulnerable to violent disruption than the world of today. Serious stresses involving inter-religious relations, the economy, pollution, resources, environment and security loom ahead.

While population growth will continue to be a global issue, economic security will be the paramount concern. Multinational corporations will attempt to unify the world.

Information technology will continue to grow. By 2010, the sheer quantity of open source and intelligence information to collect, analyze, assess, synthesize, and

disseminate will present a great challenge. Any nation that dominates information technology will be among the leading powers of the twenty-first century.

Overall, the transportation infrastructure will improve worldwide; however, a limited infrastructure in the developing countries will restrict theater operations in their areas. Reduced military forces stationed overseas and loss of military access rights in foreign nations will severely strain the OCONUS infrastructure. The DOD will continue to integrate commercial standards and practices into military organizations. The defense transportation system (DTS) will transport new weapon systems that will tend to be lighter than existing systems (USTRANSCOM 1999).

Transportation platform changes will be evolutionary, not revolutionary. This will not be due to technological unfeasibility, but to the lengthy cycle time needed to develop, test, refine, and incorporate these platforms. High costs will also limit the fielding of new transportation technology, which may result in transportation platform upgrades as the most affordable means of modernization. Improvements to transportation efficiency will yield significant return on investment. The trend will be to improve origin-to-destination transit time through the efficient integration of the various modes.

The remaining portion of this chapter is dedicated to answering the secondary questions and primary question of the thesis.

1. What were the major force projection accomplishments and lessons learned during operation Desert Shield?

Operation Desert Shield Force Projection Accomplishments

Chapter 4 provides an in depth review of the major force projection accomplishments of Operation Desert Shield. The accomplishments are best summarized

in the fact that during Desert Shield, the DOD projected forces, equipment, and sustainment, farther, faster, and in greater quantities than at any other time in America's history.

## Lessons Learned

The data contained in this section of chapter 5 is also contained on page 47 of this thesis. It is important to review this materiel before reading the remainder of this chapter. Understanding the lessons learned during Operation Desert Shield is vital to understanding the conclusions contained in the thesis. The reader must know what shortfalls were identified during the Gulf War in order to appreciate what systems have been developed to preclude them from impacting on future operations.

Afloat pre-positioning, CRAF, port operations, strategic airlift (military and commercial), strategic sealift, and the RRF, once activated worked extremely well. The war highlighted the tremendous capability of RO-RO vessels. Enroute staging bases in Europe were critical to strategic airlift. DOD needed to renew its planning efforts and enforce JOPES training in peacetime so users would be prepared to operate the system in war. USTRANSCOM and its component commands needed to push for containerization and intransit visibility in DOD. Desert Shield convinced USTRANSCOM that the C-17 aircraft would improve the strategic lift capability of the US. A combination of the RRF vessels and US flag fleet ships is vital to meeting strategic sealift requirements. Postwar studies have identified a need to increase afloat pre-positioning to meet initial requirements. Operation Desert Shield identified the need to improve the procedures for activating reserve transportation units prior the 200,000 troop presidential call-up (Mathews and Hold 1996, 42). To avoid future planning problems encountered during

Operation Desert Shield, established OPLANs must have valid TPFDD. Units must ensure TPFDD currency. The TPFDD must be validated early in the deployment and changes must be limited. For the joint chain of command to maintain visibility over the deployment, they needed to go directly to USTRANSCOM with their lift requests. They could enhance intransit visibility, speed delivery, and avoid backlogs at ports by following military standard transportation and movement procedures and by establishing airlift cargo allocation and priority systems and adhering to them. Early and accurate requirements forecasting would allow USTRANSCOM to schedule the most appropriate forms of lift against user requirements for force closure and sustainment. In general, deployment discipline would increase effectiveness and improve efficiency. (Mathews and Hold 1996, 46) With oversight of the entire transportation operation and authority to manage it, USTRANSCOM employed personnel, aircraft, ships, trains, trucks, and port assets to meet the customers' requirements. To smooth transition from peacetime operations to a wartime footing, USTRANSCOM needed to have the same roles, responsibilities, and authority in peacetime as it had in war. Authorities not granted to USTRANSCOM in peace as in war included operational control of the three component commands, charter to act as the single manager of all lift assets, and charter to be the single traffic manager.

2. What is Joint Vision 2010 and how does it support the joint forces commander?

JV 2010 is the conceptual template for how the DOD will structure its armed forces for the twenty-first century. In 2010, instead of relying on massed forces and sequential operations, we will achieve our desired endstate utilizing other methods (information superiority, advances in technology, higher lethality weapons). The services

will be required to fight as a joint force and accomplish the effects of mass with less need to mass forces physically than in the past. JV 2010 ensures the armed forces of the US are prepared to fight as a joint team, focused on executing the joint forces commanders intent. The vision provides for a common focus for the services and therefore provides for a common foundation.

JV 2010 provides an operationally based template for the evolution of the armed forces for a challenging and uncertain future. It must become a benchmark for Service and unified command visions (Chairman of the Joint Chiefs 1996, 1). It is supported by numerous initiatives to include changes in joint doctrine, service initiatives, the revolution in military affairs (RMA), and the revolution in business affairs (RBA).

## Doctrine

The joint deployment training center's mission includes actively shaping joint deployment doctrine. Many key joint publications that support joint deployment and rapid distribution have recently been completed or are currently under development.

JP 4-01.1 describes airlift support to joint military operations and the airlift planning process. JP 4-01.1 specifies joint tactics, techniques, and procedures for the planning and employment of airlift. It covers the authority and responsibilities of combatant commanders, component commanders, and all agencies involved in the deployment and sustainment of a joint force.

JP 4-01.2 discusses sealift support of the National military strategy. It covers the organization of and responsibilities for sealift support to joint operations and the employment of sealift forces. JP 4-01.2 also details activation programs and acquisition procedures.

Other joint publications that support joint deployment and rapid distribution include:

1. JP 4-01, *Joint Doctrine for Defense Transportation System*

2. JP 4-01.5, *Joint Terminal Operations*

3. JP 4-01.2, *Pre-positioning*

4. JP 3-35, *Deployment and Redeployment*

5. JP 4-01.4, *Joint Tactics, Techniques, and Procedures (JTTP) for Theater Distribution*

6. JP 4-01.8, *JRSOI*

7. JP 3-17, *Joint Tactics, Techniques, and Procedures (JTTP) for Air Mobility Operations*

8. JP 4.01.1, *JTTP for Airlift Support*

9. JP 4-01.2, *JTTP for Sealift Support*

10. JP 4-01.5, *JTTP for Water Terminal Operations*

11. JP 4-01.6, *JTTP for JLOTS*

12. JP 4-01.7, *JTTP for Intermodal Containers*

## DOD and the Revolution in Military Affairs in 2010

The DOD is preparing now for future challenges to the defense strategy for the twenty-first century. The DOD and the services are committed to implementing and underwriting JV 2010 and the complementary Service visions. Efforts to modernize America's current force are integral to that implementation. Even more important are efforts to leverage new technologies to harness the RMA through new operational concepts, new doctrine, and, ultimately, organizational changes. In addition, the DOD must be innovation with such initiatives as the battle laboratories and warfighting

experiments to ensure future concepts and capabilities are successfully integrated into the force in a timely manner.

The US military is committed to realizing joint and service visions of modern warfare and is taking a number of steps to do so, including studies, war games, research and development, advanced concept technology demonstrations, and simulated warfighting experiments. Through these efforts, the armed forces are identifying, developing, and testing concepts and capabilities that will ensure their ability to transform for the future.

The Army has two initiatives currently under development, Force XXI and The Army After Next. These processes are identifying new concepts of land warfare that have radical implications for the army's organization, structure, operations, and support. Lighter, more durable, and more lethal equipment will enhance deployability and sustainability. Advanced information technologies will help the army conduct decisive operations. The Army After Next program is a comprehensive initiative designed to better understand the probable nature of warfare thirty years into the future and provide focus to today's development efforts. Through an annual cycle of war games, workshops, and conferences, the Army strives to lay the research foundation necessary for assessing the effects of increased mobility, lethality, and maneuver.

*Global Engagement: A Vision for the 21st Century Air Force* is the Air Force vision of air and space warfare through 2010. Rapid global mobility will ensure the US can respond anywhere on the globe. The Air Force has established six new battle laboratories to implement this mission. Their mission is to rapidly identify and validate innovative ideas that improve the ability of the Air Force to execute its core competencies

and joint warfighting. The concepts validated in the labs will be assimilated into Air Force organizational, doctrinal, training, and acquisition efforts.

The Navy's future vision of warfare, *Forward...From the Sea*, identifies five fundamental roles: sea control and maritime supremacy, power projection from the sea to land, strategic deterrence, strategic sealift, and forward naval presence. The Navy is working to fulfill these roles with vastly enhanced capabilities. The Navy has embraced an RMA concept called network-centric warfare. The concept combines the ability of widely dispersed but robustly networked sensors, command centers, and forces to have significantly enhanced massed effects. Combining forward presence with network-centric combat power, the Navy will close timelines, decisively alter initial conditions, and seek to head off undesired events. The Navy also uses warfighting experiments to integrate technological advances and innovative operational concepts with real-world training.

The Marine Corps *Operational Maneuver from the Sea* anticipates warfare that requires tactically adaptive, technologically agile, opportunistic, and exploitative forces. The focus of the Marine Corps RMA efforts is on the enhancement of the individual marine. The Marine Corps combat development system focuses on generating the most effective combination of innovative operational concepts, new organizational structures, and emerging technologies. The commandant's warfighting laboratory at Quantico, Virginia, institutionalizes the service's commitment to innovation.

## DOD and the Revolution in Business Affairs

A RBA has also begun in the DOD reengineer the DOD's infrastructure and business practices. These initiatives seek to parallel the work being done to exploit the

RMA. The RBA in DOD includes reducing overhead and streamlining infrastructure. It highlights taking maximum advantage of acquisition reform, outsourcing and privatizing a wide range of support activities when the necessary competitive conditions exist and leveraging commercial and dual-use technology. RBA calls for the reducing of unneeded standards and specifications, utilization of integrated process and product development, and the increasing of cooperative development programs with allies. Measures such as these can shorten cycle times, particularly for the procurement of mature systems. They enhance program stability, increase efficiencies, and assure management focus on core competencies. Actions taken can free resources for investment in other high-priority areas.

3. What is the threat in the twenty-first century?

Twenty-First Century Threat

As described in chapter 1, the threats to America's vital interests in the twenty-first century will be numerous and many of them will be unforeseeable. Future threats include sabotage of the US information infrastructure, terrorism, proliferation of weapons of mass destruction, and the spread of extremist Muslim nationalism in the Middle East. Uncertainty exists over the future of Russia and questionable security of poorly maintained intercontinental ballistic missile systems in the former soviet republics. The US will face two scenarios in 2010 where adversaries that could involve this nation into a major theater war, a Southwest Asia (SWA) scenario and a Korean scenario.

In SWA, both Iraq and Iran will continue to pose threats to their neighbors and to the free flow of oil from the region. Both nations continue to build their military and remain the principle military powers in the region.

North Korea continues to pose a highly unpredictable threat. The military in North Korea has positioned the majority its offensive military capabilities on South Korea's border. North Korea also will continue to face enormous pressures caused by the dire economic conditions.

4. Will the Department of Defense (DOD) have sufficient assets (strategic airlift, strategic sealift, and pre-positioned) to support a major theater of war (MTW) in 2010?

In the twenty-first century, more than ever, the US nation will need rapid, flexible and responsible air mobility. America's global reach will promote stability in regions by providing the capability to respond quickly to any area of the world. US Forces must be able to provide a rapid, tailored response with a capability to intervene against a well-equipped fore, hit hard, and terminate quickly. Rapid global mobility lies at the heart of US strategy in this environment. Without the capability to project forces, there is no conventional deterrent.

Based on the strategic lift requirements of Desert Shield, the DOD will have sufficient strategic assets to support force projection to a major theater of war in 2010. USTRANSCOM has significant refined its role and has ten years of experience in reacting to crisis-situations. AMC has increased its capability with the addition of the C-17 aircraft and a significant increase in the number of aircraft enrolled in the CRAF. The MSC increased its lift capability with the addition of nineteen large medium speed RO-ROs, a strong modernization program, and the creation of the VISA program.

## The Role of USTRANSCOM in 2010

As part of the strategic planning process, USTRANSCOM its component commands actively participate in defining a future environment in which the defense transportation

system will operate. It conducts analysis and validation of strategic planning assumptions, assesses the current environment, and develops the strategic planning vision, goals, and objectives. Execution of future mobility requirements in support of JV 2010 will continue to rely on strategic lift assets. USTRANSCOM will ensure the US maintains the ability to project power unilaterally. Future logistics requirements and infrastructure limitations will challenge mobility systems to provide rapid, reliable, and timely delivery of high priority sustainment assets in peace and war. Afloat and ashore pre-positioning has increased significantly during the 1990s and now provides a credible method of quickly employing combat power into a crisis area.

AMC assets for the twenty-first century are listed in table 7. The C-17 Globemaster III is AMC's newest, most flexible cargo aircraft. The C-17 is capable of rapid strategic delivery of troops and all types of cargo to main operating bases or directly to forward bases in the deployment area. Threats to US interests have changed in recent years and the size and weight of US mechanized firepower and equipment has grown in response to improved capabilities of potential adversaries. The C-17 is operated by a crew of three (pilot, copilot and loadmaster), reducing the manpower requirement of the C-141 by eliminating the need for a navigator and second loadmaster. The C-17 can operate on small, austere airfields. It can take off and land on runways as short as 3,000 feet and as narrow as 90 feet wide. Even on such narrow runways, the aircraft can turn around by using its backing capability while performing a three-point star turn.

TABLE 7
COMPONENT BREAKDOWN BY TYPE OF AMC AIRCRAFT

| | C-5 | C-17* | C-130 | C-141 | KC-10 | KC-135 | TOTAL |
|---|---|---|---|---|---|---|---|
| Active Dury | 64 | 38 | 84 | 92 | 54 | 170 | 502 |
| Guard/ Reserve | 40 | - | 296 | 56 | - | 252 | 644 |

* When the C-17 fielding is completed, nearly half of the fleet will be located in the guard and reserve.

* Projected total end-strength is 137

(*Air Mobility Command Homepage:* Air Mobility Command 1999, 1)

AMC is authorized 141,724 airmen and civilians. Of this number, 35.8 thousand serve in the national guard and 45 thousand serve in the reserves. Fifty-nine percent of AMC's airlift capability and fifty-four percent of AMC's aerial refueling capability are located in the guard and reserve. Operation Desert Shield demonstrated the importance of the early activation of guard and reserve units

The C-5 Galaxy was the backbone of America's strategic airlift fleet from the early 1970s to the late 1990s. Its reliability rates are dropping because the engines and avionics are beginning to show their age. Testing and analysis have revealed that the C-5 has 80 percent of its structural life remaining. Lockheed Martin Corporation, has been awarded a $120 million contract to provide engineering and manufacturing development through FY 2002 for avionics modernization programs kits for the 126 C-5 aircraft. These kits include global air traffic management and all-weather flight control systems.

Entering the twenty-first century, AMC has two significant issues, C-5 reliability rates and a shortage of pilots. The requirement for an engine modification program for

the C-5 has been identified and is currently being studied. The Air Force anticipates solving its pilot shortage issue by the year 2005 through a bonus program and an increase in the number of pilot candidates entering training each year.

The CRAF program has increased the number of aircraft enrolled in the international long-distance category and will continue to provide support for military operations.

MSC will continue to provide the bulk of the strategic lift in the 2010. The primary platforms MSC will employ to provide strategic sea lift will be the RRF, US commercial charters, VISA, chartering, and the Effective US Controlled Ships as authorized by the Merchant Marine Act of 1936, section 902.

The RRF is maintained by the Maritime Administration. Once activated, RRF ships come under the operational control of MSC. RRF numbers more than ninety-five ships and is projected to grow to 140 ships by 2005. The RRF includes ten crane ships, specifically designed to discharge military cargo at less developed or war damaged ports.

The United States Naval Ship (USNS) *Mercy* and USNS *Comfort* are organized under the RRF and are designed to provide emergency, on-site care for combat forces. Each contains twelve operating rooms and 1,000 hospital beds. The hospital ships can be fully activated with a staff of 1,200 medical personnel and seventy crewmembers within five days.

The two aviation logistics support ships, the *Wright* and the *Curtis*, are also in the RRF inventory. They provide both sealift for movement of an aircraft intermediate maintenance activity and at-sea maintenance support of USMC aircraft. Both ships are maintained in a five-day readiness state.

The RRF contains eight fast sealift ships (FSS). These fast sealift ships are the fastest cargo ships in the world, making them a key part of MSC's rapid surge capability. At 946 feet in length, they are nearly the size of aircraft carriers and can travel at more than thirty knots. FSS are normally kept in a reduced operating status and can be activated and ready to move to their respective loading berths in ninety-six hours. All eight FSSs combined can carry nearly the equivalent of a full Army mechanized division. This fleet has RO-RO capability, cranes for additional lift, helicopter handling and storage facilities. These ships are equipped with self-contained ramps for wheeled and tracked vehicles as well as twin cranes amidships and aft for loading and unloading equipment and supplies where proper port facilities do not exist.

In the event there are insufficient assets in the MSC controlled fleet from which to draw, additional sealift assets are available to support contingency operations by chartering US commercial charters. The VISA is the primary sealift mobilization program in MSC. VISA is a contractual arrangement for obtaining time-phased access to US flag commercial carriers, infrastructure and intermodal capabilities to support DOD contingency requirements.

Another sealift source requiring presidential approval for requisitioning is the effective US controlled ships as authorized by the Merchant Marine Act of 1936, section 902. Under this provision, these are ships owned by US citizens, but are registered under foreign flags of convenience such as Honduras, Panama and the Bahamas. Currently there are 126 ships in this category. In time of war, these ships, in addition to US flag ships and the ships of our allies can be called into action. Another possible source of

sealift would be merchant ships from the North American Treaty Organization (NATO) allies identified for mobilization.

In the event of a mobilization, naval reservists provide MSC with up to 80 percent of its necessary military strength. MSC has more than 700 officer and 800 enlisted billets in thirty-eight MSC reserve units.

Afloat pre-positioning ships and ashore pre-positioning will continue to be vital to protecting our national assets. The successful deployment of US military forces in the twenty-first century depends on the ability to act quickly. MSC's pre-positioning ships provide a fast, powerful military response anywhere in the world. Ashore pre-positioning in the potential crisis areas of Kuwait and Korea allow the US to put combat power on the ground quickly.

Strategic lift does have some significant issues that are currently being evaluated. Lack of enroute support facilities reduces the capability necessary for rapid deployments. Loss of mobility en route infrastructure could result in decreases of airlift throughput, ultimately affecting our ability to meet closure. Air mobility squadrons can forward deploy a variety of tailored force mobility packages in support of contingency operations, giving us the ability to expedite deployment into airports with limited mobility support capabilities. The ability to utilize commercial strategic seaports is a tremendous asset for deployment capability. However, there are concerns about insufficient berths for the LMSRs at commercial port facilities.

6. Will the concept of rapid distribution support accelerated delivery of logistics resources to the theater of operations?

The capability for rapid distribution and asset visibility in the twenty-first century far exceeds the capability available during Desert Shield. DOD, the services, and the CINCs have made significant contributions to developing a reliable, near-real time system of ensuring rapid distribution and total asset visibility.

## Rapid Distribution and Asset Visibility in 2010

The success of joint total asset visibility (JTAV) in 2010 hinges on the successful integration of its system components. Each DOD component is developing an internal JTAV capability to meet its needs in relation to its assigned mission.

Army total asset visibility (ATAV) assimilates data from as many as forty-two data sources to provide users with a correct and complete database. ATAV provides asset quantity on hand (on-hand quantity, due-in quantity, due-out quantity, and condition), force structure (down to company level), and authorizations for major end items and repair parts. The system also provides in-transit visibility information of assets by document number, stock number, voyage and flight number, transportation control number and radio frequency tag.

Navy total asset visibility targets afloat asset visibility for operational shipboard assets, assets under repair for parts at both the organizational and commercial repair activities, Navy inventory control points, and the Defense Reutilization and Marketing Service that permits review of disposal assets by the materiel manager. The Navy also developed a set of web-based tools that educate users and expand user access to emerging DOD TAV initiatives.

The Air Force conducted two studies to establish an Air Force JTAV strategy. The first study Total Asset Visibility: Improving Logistics Capabilities documented the

evolution of TAV capabilities and identified requirements for the Air Force. The second study Total Asset Visibility: Roadmap to the Future specifies an execution strategy that invests in three areas: policy, education and training, and systems development and integration. The Air Force identified twelve initiatives to achieve a TAV capability.

The Marine Corps invested in developing wholesale and retail TAV programs as well as solidifying their integration into the JTAV system. The USMC identified testing and development of inter-service visibility and redistribution of reparables and consumables its top priority and incorporated TAV requirements into its asset tracking logistics and supply system.

The Defense Logistics Agency (DLA) developed the Personal Computer Logistics Information Network (PC LINK). PC LINK provides access to many logistics databases. It can access the document number of items ordered by any service. The system provides access to the standard automated materiel management system for wholesale item inventory and supply management information at DLA supply centers. In addition, PC LINK can access ATAV for visibility of stock levels in Army commands, stock visibility at Navy stock points, and provides visibility of cargo transitioning common-use ocean ports by means of the worldwide port system.

USTRANSCOM through the GTN can maintain visibility of units and equipment during deployment by any mode of transportation (surface, sea, or air). GTN provides real-time access to information and provides rapid, accurate, automated source data to the user.

7. Will the downsizing of the military's force structure negatively impact the armed forces ability to project forces?

The downsizing of the military during the 1990s did not have an impact on the military's ability to project forces. Development of the C-17, the VISA, increases in the number of CRAF aircraft, increases in equipment pre-positioning, modifications to the C-5 and upgrades to the RRF have ensured American's capability to project forces worldwide.

## Primary Question

Can the joint deployment and rapid distribution tenet of focused logistics enable the joint force commander of 2010 to project required forces into the theater of operations as efficiently as the force projection structure employed in support of Operation Desert Shield?

The data contained in this thesis indicates that the joint deployment and rapid distribution tenet of focused logistics is extremely capable of projecting forces, equipment, and sustainment requirements anywhere in the world. It is more efficient than the structure employed during Operation Desert Shield. A major reason for its superiority is that the US military took the lessons learned from Desert Shield and developed systems and procedures to preclude them from affecting future deployments. JV 2010 roadmaps the future to success for America.

# GLOSSARY

Agile Infrastructure is the rightsizing of the logistics footprint through reductions in logistics forces, facilities, equipment and supplies.

Air Mobility Command (AMC) - An Air Force major command and USTRANSCOM's air force component command responsible for DOD strategic airlift and aerial refueling.

Civil Reserve Air Fleet (CRAF) - Is a program in which commercial airlines agree to make aircraft available for DOD programs in exchange for peacetime military business.

Dominant Maneuver is the multidimensional application of information, engagement, and mobility capabilities to position and employ widely dispersed joint air, land, and sea forces to accomplish assigned operational tasks. It will allow our forces to gain a decisive advantage by controlling the breadth, depth, and height of the battlespace. Dominant maneuver will require forces that are adept at conducting sustained and synchronized operations from dispersed locations.

Focused Logistics is the fusion of information, logistics, and transportation technologies to provide rapid crisis response, to track and shift assets even while enroute and to deliver tailored logistics packages and sustainment directly at the strategic, operational, and tactical levels of war.

Force Projection is the movement of military forces from CONUS or another theater in response to requirements of war or military operations other than war (MOOTW). Force projection operations extend from mobilization and deployment of forces, to redeployment to CONUS or home theater, to subsequent demobilization.

Forward Presence - Those US active component and reserve forces assigned or deployed overseas in a specific theater.

Full-Dimensional Protection acknowledges that we must protect our own forces from the very technologies that we are exploiting. The primary prerequisite for full-dimensional protection will be control of the battlespace to ensure our forces can maintain freedom of action during deployment, maneuver and engagement, while providing multi-layered defenses for our forces and facilities.

Information Superiority is the capability to collect, process, and disseminate an uninterrupted flow of precise and reliable information while exploiting or denying an adversary's ability to do the same. It allows commanders to employ widely dispersed joint forces in decisive operations, engage and reengage with the appropriate force, protect the force throughout the battlespace, and conduct tailored logistical support.

Host Nation Support - Civil and military assistance rendered by a nation to foreign forces within its territory during a crisis, in peacetime, or war; assistance provided during these operations based on agreements mutually concluded between nations.

Information Fusion is timely and accurate access to logistics data across units and combat support agencies throughout the world. This provides reliable asset visibility and access to logistics resources in support of the warfighter

Intransit Visibility is the intermediate availability of data pertaining to the location of materiel intransit from the provider to the requester. The ability to track the identity, status, and location of DOD units, and non-unit cargo (excluding bulk petroleum, oils, and lubricants) and passengers, medical patients, and personal property from origin to consignee or destination across the range of military operations.

Intertheater is the movement between theaters or between the continental US and a theater.

Joint Deployment and Rapid Distribution is the process of moving multi-service forces to an operational area coupled with the accelerated delivery of logistics resources. Improved transportation and information networks will accomplish this. This provides the warfighter with vastly improved visibility and accessibility of assets from source of supply to point of need. It further develops the joint reception, staging, onward movement, and integration (JRSOI) phase of joint force protection.

Joint Force - A general term applied to a force that is composed of significant elements of the Army, Navy, Marine Corps and Air Force, or two or more of these services and operating under a single commander authorized to exercise unified command or operational control over them.

Joint Forces Commander - Applies to the CINC and those of his subordinates who control forces of more than one service.

Joint Theater Logistics Command and Control requires the theater logistical functions to come under the command and control of a single joint staff responsible for supporting all forces in theater.

Joint Health Services Support (JHSS) provides for essential care in theater, enhanced aeromedical evacuation, and definitive care upon reaching CONUS.

Joint Operation Planning and Execution System (JOPES) - The primary system used by the joint planning and execution community (JPEC) in the deliberate and crisis

action planning process. It is a comprehensive, integrated system of people, policies, procedures, and reporting systems supported by automated systems and applications. It provides the capability both to develop time phased force deployment data (TPFDD) and to monitor the execution of the deployment. JOPES was initially designed to provide strategic deployment useful to the NCA, the strategic level staffs, the combatant commands, the defense agencies, and the services. A continuously evolving system developed through the integration and enhancement of earlier planning and execution systems such as the joint operation planning system and joint deployment system. It provides the foundation for conventional command and control by national and theater-level commanders and their staffs. It is designed to satisfy their information needs in the conduct of joint planning and operations. Joint operation planning and execution system (JOPES) includes joint operation planning policies, procedures, and reporting structures supported by communications and automated data processing systems. JOPES is a tool used to monitor, plan, and execute mobilization, deployment, employment, and sustainment activities associated with joint operations.

Joint Vision 2010 is the DOD's conceptual template for structuring the armed forces for the twenty-first century.

Logistics - The process of planning and executing the movement and sustainment of operating forces in the execution of a military strategy and operations. The art of logistics is how to integrate the strategic, operational and tactical sustainment efforts within the theater, while scheduling the mobilization and deployment of units, personnel, and supplies in support of the employment concept of a geographic combatant commander.

Military Sealift Command (MSC) is USTRANSCOM's component command responsible for designated sealift service. MSC coordinates and provides ocean transport of equipment, fuel, supplies, and ammunition to sustain US forces worldwide during peacetime and in war. The command also operates ships for US Navy fleet support; provides special ocean mission support; and prepositions US military supplies and equipment at sea.

Military Traffic Management Command (MTMC) is USTRANSCOM's component command responsible for military traffic, continental US air, and land transportation, and common-user water terminals.

Mobility Requirements Study (MRS) is the strategic mobility capabilities required to support two nearly simultaneous major theater wars. This requirement is defined in the 1994/1995 Mobility Requirements Study Bottom Up Review Update (MRS BURU). MRS BURU identified significant deficits in the US's ability to meet oversize and outsize airlift cargo requirements. The MRS BURU analysis, in fact, led to a decision in 1995 to significantly modernize the Air Force's strategic airlift fleet.

Multinational Logistics is the mutual logistics support relationships between the US and allied/coalition partners. The increasing frequency of multinational operations is both a force multiplier and challenge to national interoperability.

Precision Engagement consists of a system of systems that enables US forces to locate the objective or target, provide responsive command control, generate the desired effect, assess the level of success, and retain the flexibility to reengage with precision when required.

Pre-positioning (PREPO) - To place military units, equipment, or supplies at or near the point of planned use or at a designated location to reduce reaction time, and to ensure timely support of a specific force during initial phases of an operation

Ready Reserve Force (RRF) - US government-owned fleet of commercially designed deep-draft ships of various configurations and capabilities maintained by the Department of Transportation Maritime Administration to respond within four, five, ten or twenty days to national emergency sealift requirements, particularly the movement of military unit equipment.

Roll-on/Roll-off (RO-RO) is a ship capable of allowing vehicles to drive on and drive off the vessel without the requirement of a lifting device.

Strategic Airlift is the common-user airlift linking theaters to CONUS and to other theaters, as well as the airlift within CONUS. These airlift assets are assigned to the CINC, USTRANSCOM. Due to the intertheater ranges usually involved, strategic airlift is normally comprised of the heavy, longer range, and intercontinental airlift assets. It is the transportation of personnel and materiel through the air

Strategic Sealift is the afloat pre-positioning and ocean movement of military materiel in support of US and allied forces or other government-sponsored materiel deemed in the national interest. Includes government-owned and commercially acquired shipping (US and foreign flag) and associated shipping services.

Sealift Readiness Program (SRP) - The SRP is a contractual program requiring shipping companies that bid on Military Sealift Command contracts to commit fifty percent of their cargo capacity to the program. Additionally, those ships built with construction subsidies or receiving operating subsidies are committed to the SRP. A standby contractual agreement between MSC and US ship operators for voluntary provision of private ships for defense use. Authorization to call-up of ships requires the joint approval of the Secretary of Defense (SECDEF) and the Secretary of Transportation.

Technological Innovation is the leveraging of emerging technologies to enhance capabilities through development of new doctrine, organizations, material, equipment, and training.

Theater Distribution (TD) is a comprehensive distribution system for deployment, sustainment and redeployment of units, personnel, materiel, and equipment to and from designated points of need.

Time-Phased Force Deployment Data (TPFDD) - The joint operation planning and execution system data base portion of an operation plan. It contains time-phased force data, non-unit-related cargo and personnel data, and movement data for the operation plan, including:

1. In-place units
2. Units requiring deployment to support the operation plan with a priority indicating the desired sequence for their arrival at the port of debarkation.
3. Routing of forces to be deployed
4. Movement data associated with deploying forces
5. Estimates of non-unit-related cargo and personnel movements
6. Estimate of transportation requirements filled by common-user lift resources as well as transportation requirement shortfalls

Time-Phased Force and Deployment List (TPFDL) identifies types or actual units required to support the operation plan and indicates origin and ports of debarkation. It generates a computer listing from the time-phased force and deployment data.

US Transportation Command (USTRANSCOM) is a unified headquarters with the mission to provide strategic air, land, and sea transportation to deploy, employ, and sustain military forces to meet national security objectives throughout the range of military operations. USTRANSCOM has three subordinate component commands: the Military Sealift Command (MSC), the Air Mobility Command (AMC), and the Military Traffic Management Command (MTMC).

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